THE IRON AGE

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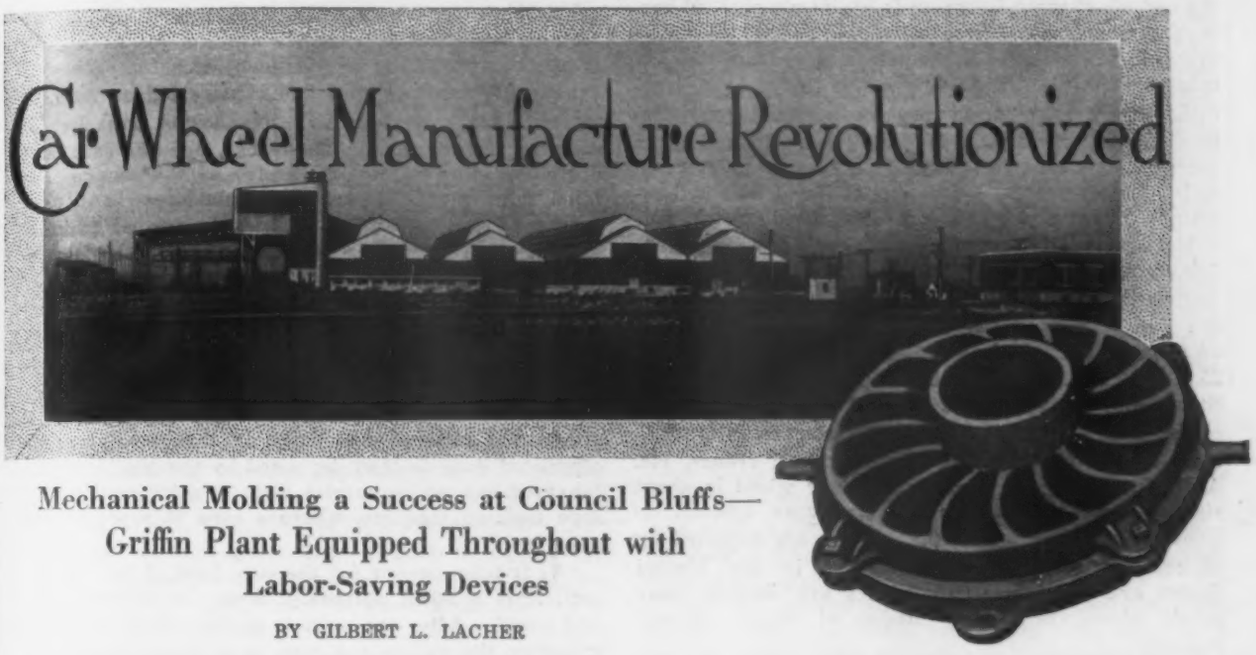


Mechanical Molding a Success at Council Bluffs—Griffin Plant Equipped Throughout with Labor-Saving Devices

BY GILBERT L. LACHER

CONSTRUCTION of the Council Bluffs, Iowa, plant of the Griffin Wheel Co., Chicago, introduces a new epoch in the manufacture of chilled iron car wheels. In contrast with existing car wheel foundries, all of which were laid out for hand molding, the new Griffin plant was designed and equipped for the mechanical handling of practically all operations and, what is more important, this innovation in practice has proved not only feasible but economical.

That success has been achieved in solving the problem of mechanical molding of car wheels is hardly more surprising than that it was undertaken at all, in view of the discouraging experience of others who have tried it in the past. Necessity, however, is generally the compelling reason for risking radical deviations from established practice. In this case, necessity lay in the labor situation, which was rendered particularly acute by the world war. In times of labor scarcity it is always exceedingly difficult to induce men to take up the arduous work of a wheel foundry and, even when labor is more plentiful, it is not easy to fill the ranks.

Manual molding of car wheels calls for a physique which will stand heavy lifting and long hours in an atmosphere of variable temperature, often aggravated by the presence of steam and gas. In shops producing more than 175 wheels per cupola, the hours during which the labor necessarily must be performed are unattractive. This is because all molds must be made up prior to the time at which pouring begins, for the conditions are such that a molder cannot work intermittently, molding and pouring. Hence is is necessary to begin operations at 3 or 4 a. m., so that the men who receive iron first will be ready at 8 or 9 a.m.

Because everything connected with it is heavy, the work is laborious. A molder and helper handle about eight tons of sand; this must be tempered, cut over two or three times, shoveled into the molds, tamped, shaken out again, and left in proper shape to condition over night. Ten tons of metal must be poured by the same two men, and the wheels shaken out at the proper time. Car wheels are unlike other castings, which may remain indefinitely in the molds, for, if allowed to remain overtime for even a few minutes, the wheels are spoiled. This requires the maximum exertion during the time of shaking out, which at most seasons of the year is very hot work, developing profuse perspiration and putting the molder in such condition that he cannot

EMBODYING revolutionary methods of handling the heavy molds incident to the making of railroad car wheels, the new Griffin plant in Council Bluffs, Iowa, is confidently expected to show reduced production costs. The outstanding innovations are described and illustrated in this article; the Council Bluffs methods of handling other foundry problems will follow in the second installment. With plants active in Boston, Chicago, Denver, Detroit, Kansas City, Kensington, Los Angeles, St. Paul and Tacoma, the best ideas from all these sources have been gathered into the new unit and whipped into one harmonious whole. Operations under these auspicious beginnings will be watched with great interest by foundrymen the country over, but more particularly by those who have similar obstacles to overcome.

go back to work in a cool atmosphere. The only thing that attracts men to this work is the wage, which is universally on a piece-work basis. There is no union, and the rate paid is always materially higher than that paid union molders.

On account of the unattractive character of the work, there is never a surplus of molders. Most molders now employed are well along in years and restrictions on immigration limit the manual labor available from abroad. Moreover, the younger generation in this country will not take up so strenuous vocations as their fathers. Hence the labor problem confronting the car wheel manufacturers is a difficult one. Whenever an increase in output is required, it is necessary to break in new men as helpers and promote the old helpers to molders; and very often this process is so rapid that a long period must be passed through before molding operations are stabilized. In adding to the working force, it is usually necessary to start in at least ten new men before one is found who will remain permanently. Thus the rate of labor turnover is increasing and the average efficiency of wheel foundries is held down.

The importance of finding a solution of the problem can best be appreciated by considering the magnitude of the car wheel industry. Fully 95 per cent of the 25,000,000 railroad car wheels in service in the United States and Canada are of chilled iron. In addition, chilled-iron wheels are used for street cars, interurban cars, industrial cars, locomotive tenders, cranes, etc. As the average life of a railroad car wheel is about eight years, the renewal requirements amount to 3,000,000 wheels per annum. These are supplied by 25 chilled-iron wheel manufacturers in the United States and Canada, whose plants are located near points where the largest number of wheels are put into use.

During the past two decades several attempts made to replace labor with mechanical molding devices all proved dismal failures, notwithstanding the large sums of money use in experiments. Not until 1919, when the Griffin Wheel Co. conducted an experiment at its Kansas City plant, was a successful car wheel molding unit perfected. This was followed by the Brown Car Wheel Co., Buffalo, N. Y., in a modified form for a small shop, where it has been successfully applied since the spring of 1921. This was described briefly at page 662, THE IRON AGE, Sept. 15, 1921.

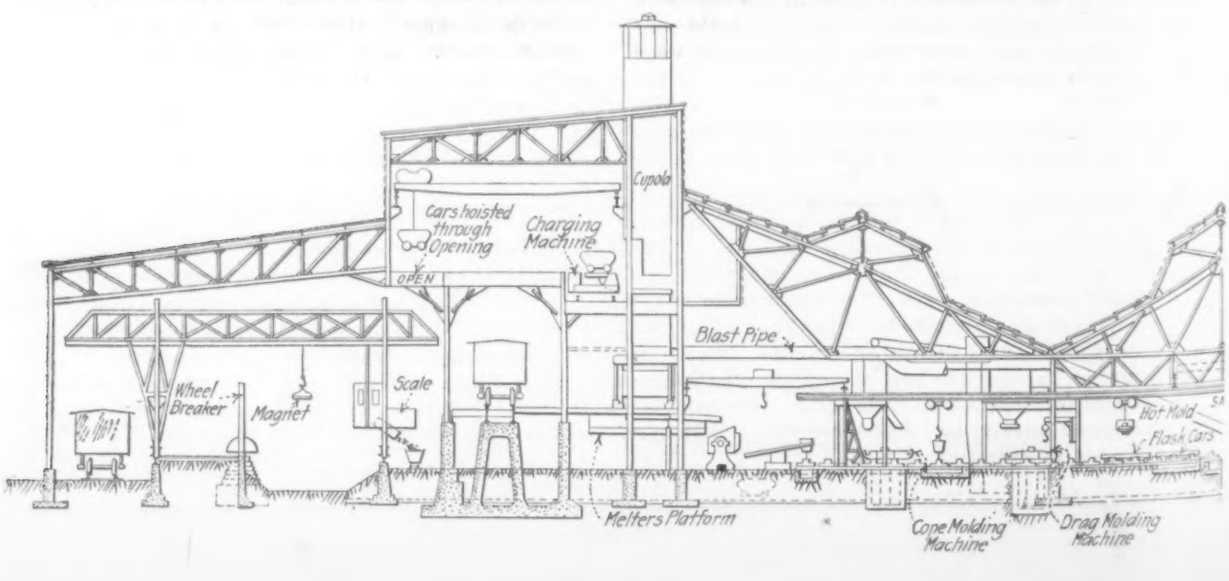
But the Council Bluffs plan is the first car wheel foundry to be designed and built expressly for mechanical handling of all molding operations. While the company had already decided to erect a new plant to meet the growing demand for its product, the successful experiment at Kansas City led it to discard old practices entirely, in favor of mechanical methods of operation throughout the yard, charging room and molding room.

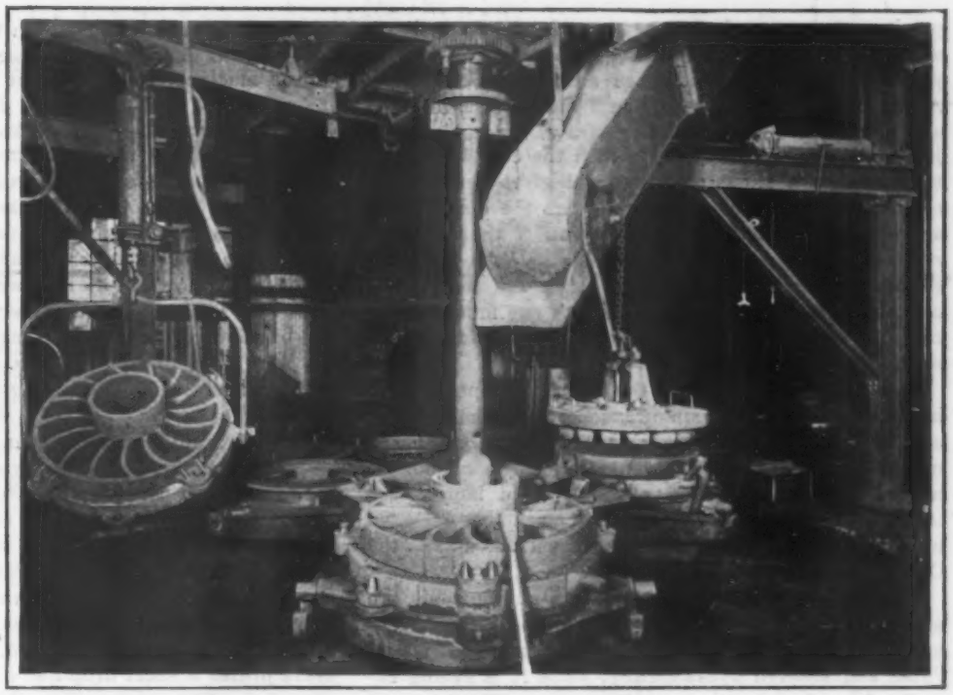
In the molding room of the Griffin plant an outstanding feature is the method of handling molds from the molding machines to the cupola and thence to the shake-out grates. The molding room is divided into two complete units which are the converse of each other. There are four molding machines, two for each half of the room. As soon as the drag mold is made it is conveyed to the second molding machine, where the cope is superimposed upon it and the finished mold is advanced to the pouring station. Thence the mold is conveyed to the shake-out grates, whereupon the cope and drag portions of the flask are returned to the molding machines for further use.

As the process is a continuous one, the conveying equipment is so designed and constructed as to make maintenance costs low and breakdowns unlikely. It consists of two rectangular tracks, one for each half of the molding room. Each side of the rectangle is filled with cars having square platforms. At each corner of the rectangle, a hydraulic pusher cylinder operates to put the series of cars in motion, the square platform of one car pushing that of the car ahead.

On one car is placed the drag half of the flask, consisting of bottom board and nowel, immediately after the mold has been shaken out. The car then progresses to a position adjacent to the drag molding machine, where the bottom board and nowel are lifted off by jib crane, and rammed and faced in the machine. The completed drag is then deposited by the machine on a conveyor car which carries it to a point next to the cope molding machine, where a cope is superimposed upon it.

As it takes longer for the cope half of the flask to cool, it is handled differently from the bottom board and nowel. After the mold is shaken out, a jib crane transfers the chiller and cope to a square top car of the same type as those on the rectangular conveyor track. This car, however, rests on a transfer car by means of which it may be transferred to any one of a series of tracks running longitudinally on the inside of the rectangle formed by the conveyor. There are eight of these longitudinal tracks, six of which are used for storage purposes and two for the return of the empty cars to the transfer track adjacent to the shake-out grates. A second transfer track at the other end of the storage yard is used for transferring the loaded cars from storage to two short tracks serving the cope molding machine and then for returning them, after they have been unloaded, to the two longitudinal tracks which carry them back to the shake-out grates. On the storage tracks the cars move by gravity. The two transfer cars are operated by cable from motor-driven winches, while the empties are returned to the shake-out grates by hydraulic pusher cylinder.





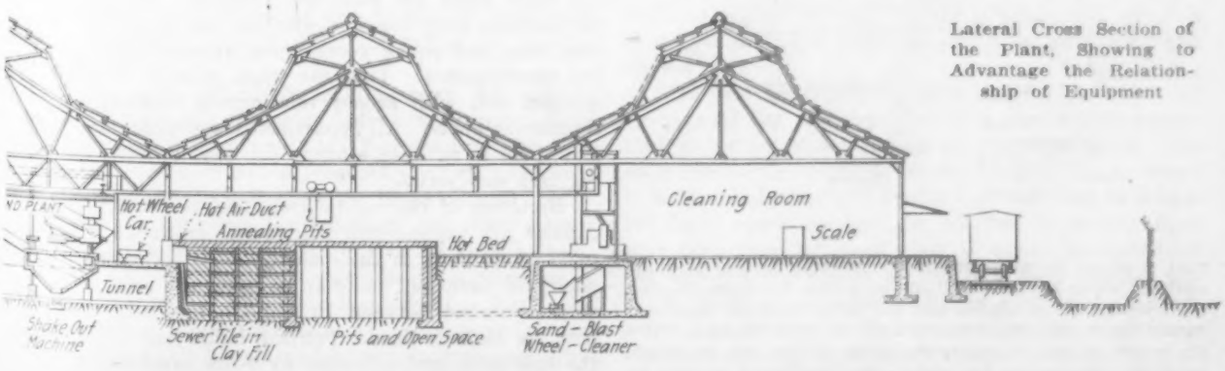
Cope Molding Machine in Foreground; Drag Machine Is Similar. Each consists of a vertical hydraulic cylinder from which three horizontal arms radiate. The arms are lifted and turned hydraulically, while, at one point in the circumference of rotation of the arms, a pneumatic jolting machine is stationed for ramming. The sand chute appears above

As soon as a cope has been rammed and faced on the cope molding machine, cope and drag are clamped together and the completed mold progresses to a point near the cupola, where the metal is poured from a ladle suspended from a 3-ton crane directly above the car. In this manner molds are poured consecutively as rapidly as the cars are moved forward on the conveying system. The hydraulic pusher cylinders which furnish the motive power for the conveyor are actuated in unison, the control being handled by the same employee who operates the drag molding machine. At each corner of the conveyor is a turntable which is rotated 90 deg. by the pusher on its return stroke. Hence, when a turntable is empty it is turned to position for the receipt of a car from the incoming side of the rectangle. When it is loaded it is rotated to position for the delivery of the car to the outgoing side of the conveyor.

The cope and drag machines are of similar construction, consisting of a vertical hydraulic cylinder from which three horizontal arms radiate. The lifting and turning of the arms is handled hydraulically, while at one point in the circumference described by the rotation of the arms, a pneumatic jolting machine is stationed for ramming purposes.

There are three separate stations in the rotation of the drag machine where certain stages in the molding operations are performed. At Station 1 the core print is placed, the number set, the pattern brushed and the nowel placed on the pattern. Then one riddle full of facing is shaken through a No. 4 riddle and tucked into the pockets on the brackets. These operations require 35 sec. At Station 2 a measuring ring is placed on the nowel, heap sand is drawn and excess heap sand is struck off. The drag is then placed on a ramming plate, given five jolts, after which the ramming plate and measuring ring are removed. The molder then strikes off and applies bottom board and clamps. These operations take 55 sec. To reduce further the time of this operation it is proposed to use a bar drag, which will eliminate the bottom board and striking off. A bar drag consists of a nowel with bars through it. By packing the sand between these bars, the need for a bottom board will no longer exist. At Station 3 the drag is turned over on its trunnions and lowered to the mold conveyor, where the clamps are knocked off and the pattern is drawn. These operations require 20 sec. Four men perform all of the operations of the drag molding machine, one of whom operates the valves controlling the raising, lowering and turning of the machine. The operation of the machine per complete revolution takes 12 sec. After the drag has been placed on the conveyor the pan core and center core are set and the chaplets are placed.

There are also three stations at the cope machine. At Station 1, the pattern is brushed, following which the dry sand dish, the head block and sprues are inserted. Then the facing ring is placed and one riddle of facing is applied, after which the cope and chiller (handled as one piece, being bolted together) are placed. These are not cast in one piece because the chiller wears out faster than the cope. Following the



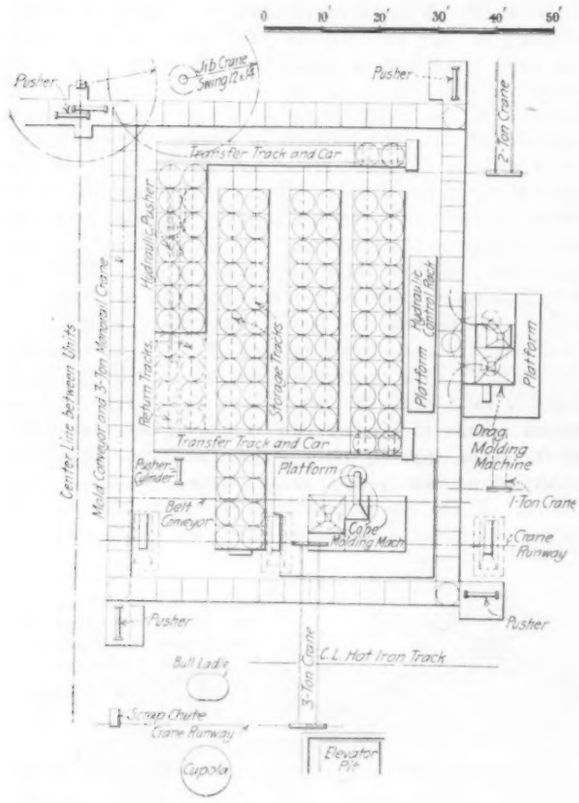
Lateral Cross Section of the Plant, Showing to Advantage the Relationship of Equipment

placing of cope and chiller two riddles of sand are applied through a No. 4 riddle, a shovelful of sand is placed in the dish and peaned around the dish core. All of the operations at Station 1 are performed in 55 sec. At Station 2 the operator draws sand, gives two jolts and strikes off at a level with the cope bars. He then applies a ramming plate and gives seven jolts, removes the ramming plate and vents the dish. These operations take 55 sec. At Station 3 the operator raises the cope, turns it over, swabs the chiller, applies the dust, turns over again and closes the mold. The average time required at Station 3 is one minute. The time in turning and raising the machine averages 12 sec. per complete revolution.

Owing to the fact that the three stations at each machine are operating simultaneously, the time for the completion of a single drag or cope averages only 1 min. 15 sec. For the convenience of the molders a molding sand hopper and a facing sand hopper are located above each machine. The machines, designed by the Griffin Wheel Co., were constructed by the Omaha Steel Works.

Mechanical facilities provided for shaking out are as ingenious as those devised for molding. The shake-out floor is commanded by a swing crane which is elevated and lowered hydraulically, while it is swung radially from its pivot column by motor. The beam of the crane may also be turned on its own axis by motor. Molds are transferred by a jib crane from the rectangular conveyor to a jolt machine in the shake-out floor, where the sand is shaken out of the flask. The shake-out crane is then swung adjacent to the jarring machine and is turned so that the wheel may be pushed into a jaw on the end of the crane beam. Upon the return of the jaw to a vertical position so that the wheel cannot roll out, a laborer knocks off the header.

Then the crane swings the wheel to another jolter,



Unit B of the Rectangular Mold Conveying System Is Symmetrical, about the Axis at Left, with Unit A. Each handles the products of one cupola and one set of molding machines, consisting of one cope machine and one drag machine. The jib cranes at top of cut carry molds to the jolt shake-out machines, whence the hot wheels are transferred at once to the annealing pits

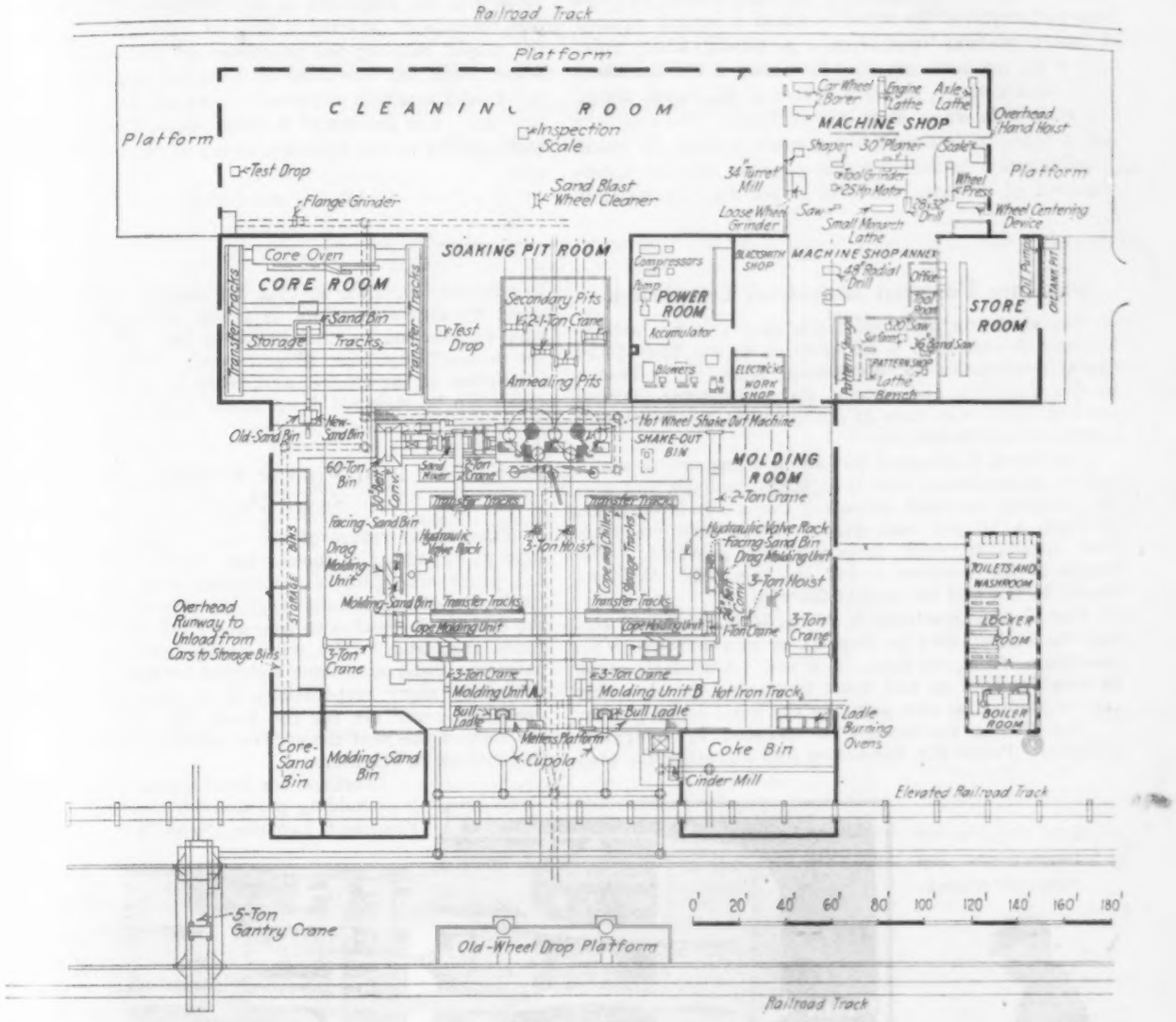
where the crane beam is again turned so the jaw is in a horizontal plane and the wheel rests flat on the table of the machine. Here further jolting shakes any remaining sand off the surface of the wheel and a pin in the center of the machine knocks out the bore core. Thereupon lifting tongs are inserted into the bore of the wheel and it is transferred, by the swing crane, to a car on the hot wheel track which runs between the shake-out floor and the cooling pits. This car, operated by motor-driven winch, is moved to a point opposite the cooling pit into which the wheel is to be lowered. The wheel is transferred from car to pit by one of four cranes which operate the entire length of the four rows of soaking pits. In this case also the lifting is effected by inserting tongs into the bore of the wheel.

The hydraulic swing cranes on the shake-out floor were designed by the company's engineering staff and constructed by the Omaha Steel Works. There are two of these machines, one for each half of the molding room. The jolting machines on the shake-out floor, as well as those used for molding, were furnished by the Herman Pneumatic Machine Co., Zelienople, Pa. There is a difference of opinion on the proper characteristics of a jarring machine. Some foundry engineers prefer a short drop and a quick jolt, producing a vibration effect, while others favor a longer drop and fewer jolts. The machines in this plant are of the latter type, having a drop of 2 in. and producing 80 jolts per min.

Under the well-planned method of routing of materials, there are no unnecessary movements in the progress of the work. This scheme of direct-line handling of materials is evident in the design of the entire plant and that so well-thought-out a plan is highly important is evident from the tonnage handled per day. The foundry was constructed for a capacity of 700 wheels per 8-hr. day. The daily tonnage of raw materials required includes 250 tons of iron, 30 tons of coke, 20 tons of sand, besides a large number of smaller items. It is therefore essential that the heavy tonnage should be unloaded in the storage yard conveniently to the cupola, and that it should move in direct line successively from the yard to the cupola, to the pouring station, to the pits, to the cleaning room and to the shipping track. The plan of the Council Bluffs foundry meets all these requirements.

It will be noted that the pouring station is in close proximity to the bull ladle, that the core room is near the spot where the cores are used, and accessible to the new sand storage and the old sand is returned from the cleaning room, that the castings department for the manufacture of chillers, copes, nowels, bottomboards, etc., is convenient for pouring and also for delivery to the machine shop for machining; and that the machine shop, which in a wheel foundry is used principally for mounting wheels on axles, is conveniently located in relation to the cleaning room, from which the wheels are received for boring, and also to the store room for receiving supplies. Inasmuch as the machine shop foreman also has charge of the pattern shop and power room, these also are adjacent to the machine shop. Thus the whole plant is a well organized unit with proper relationship between all its component parts. All departments are under one roof and there is no yard storage for any material except pig iron and scrap.

Handling of the molten iron deserves mention. The cupolas are tapped into bull ladles, stationed directly in front of them in the molding room. The rated capacity of each bull ladle is 12 tons, but actually this may be varied between 10 and 15 tons, according to how the ladle is lined. Pouring ladles are filled from the bull ladle and conveyed by 3-ton overhead traveling cranes directly over the mold conveyors, as de-



Compactness and Freedom from Lost Motion Are Essential Features of the Plant Layout. This illustration covers the entire plant except the transformer house and main office building, both of which lie at the right (east) of the upper part of the cut

scribed before. As a protection against interruption in operations, in case the mold conveying system should break down, an overhead monorail system has been well distributed throughout the molding room. This is equipped with 2- and 3-ton hand-operated Shepard hoists.

In a bay extending the whole length of one end of the molding room is a floor devoted entirely to the molding of chillers, copes, nowels, bottom-boards, etc. Iron is brought to this flood from the bull ladles on a hot iron track. A 3-ton overhead traveling crane, used for conveying the ladle to the molds for pouring, also carries the completed castings directly into the machine shop to be turned. Swinging doors have been provided where the crane passes into the machine shop, so that the two departments may be shut off from each other completely, except when the crane is passing through.

At the same end of the molding room, next to the hot iron track, are oil-heated ladle drying ovens. Here the ladles are given a preliminary heating the day they are lined, and every day subsequently before going into service they are heated until the lining is red.

Facilities provided for handling the car wheels after they leave the shake-out grates are fully as complete in their mechanical features as the equipment in the molding room. There are two sets of soaking pits, those next to the hot wheel track being used for primary cooling and the others for secondary cooling. This system of two-stage pitting was adopted for the reason that the primary pits must be kept at a high temperature for incoming wheels. The wheels remain for 24 hr. in the primary pit and for 24 hr. in the secondary pit. Each pit has a capacity of 20 wheels and the cover of the pit is removed by inserting the same scissors-like tongs which are used in handling the wheels. There is sufficient reserve space in the cooling pit room so that the soaking capacity can be practically doubled.

The soaking pit room connects with the cleaning room, which is a large department, 70 x 242 ft., with ample space for the storage of wheels prior to shipment. After leaving the pits the wheels are rolled into a sand blast, where sand is blown against the surface for a period of about 15 sec., after which the wheel is rolled out and stored on the cleaning room floor. The sand blast, designed by the company engineers, is self-sufficing so far as sand supply is concerned, as it is here that the sand from the pan core is loosened and shaken out.

The dust generated in sand blasting is drawn off by exhaust fan and deposited in a dust collector situated in an excavated portion of the plant yard. The sand drops into a tunnel below the sand blast, where it is hoisted by bucket elevator and returned to a hopper from which the sand for blasting is drawn. Surplus sand from the sand blast is moved by industrial car through the tunnel to the core sand mixing machine, where it is mixed with new core sand. An exhaust fan similar to the one serving the sand blast, although developing a much higher vacuum, is connected with hose used for cleaning the soaking pits.

Several tests required by American Railway Asso-

ciation rules are conducted in the cleaning room. The drop test requires the wheel to stand a certain number of blows without fracturing. A 650-lb. wheel must drop 9 ft. ten times without breaking, a 700-lb. wheel 10 ft. twelve times, a 750-lb. wheel 12 ft. twelve times, and an 850-lb. wheel 12 ft. fifteen times. The fracture test is taken to determine the amount of chill. A wheel is deliberately broken for this purpose and the determination of whether the chill is too high or too low rests with the judgment of an inspector. The thermo-test consists of pouring a ring of molten iron around the wheel, causing the periphery of the wheel to expand, while the hub remains cold. If the wheel does not fracture within a period of two minutes, it passes the test. The failure of a wheel in any one of these tests results in the rejection of all wheels of the same cast.

(To be concluded)

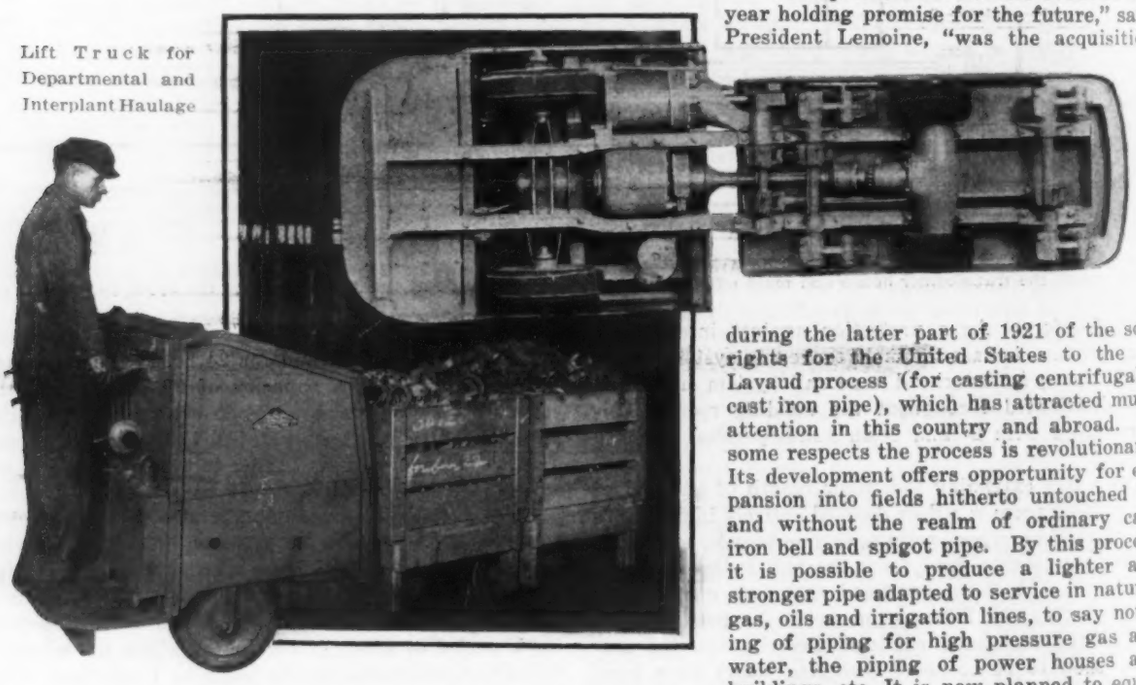
Gasoline Powered Industrial Lift Truck

The elevating platform truck shown in the accompanying illustrations is an addition to the line of the Clark Tructractor Co., Buchanan, Mich. It is known as the Truklift, and among the advantages claimed are low initial cost, ease of maintenance, flexibility and continuous 24-hr. service.

The truck is intended for use in transporting material in departmental and inter-plant haulage and also for charging core and annealing ovens. It is designed to climb a 10 per cent grade with a 4000 lb. load. Two speeds in each direction are provided. The length of the machine is 107 in., the width 35½ in., height 51 in., and the weight 2500 lb.

The loading platform is 26 by 54 in., and will elevate its load of 4000 lb. from 11 in. minimum to 16 in. maximum, from the floor, in 8 sec. Automatic stops provide for both up and down limits and the elevating can be stopped at any point by the hand control lever.

The lifting mechanism is operated by hydraulic pressure. Power for locomotion and elevating the load is from a 15-hp., 4-cylinder tractor engine with a 3⅛ in. bore and 4½ in. stroke. A three-point suspension is used, the steering wheel forks being supported in a steel casting which is pivoted at the center of the frame on a chrome-nickel steel pin 2 in. in diameter. The drive is through a bevel gear axle which is equipped with ball and roller bearings and located under the loading platform. Driving wheels are of cast steel with pressed-on rubber tires, 10½ by 5 in., and the steering wheels are of cast steel, disk type, also with rubber tires, 16 by 3½ in.



Lift Truck for Departmental and Interplant Haulage

Driving and elevating controls are mounted on the rear of the engine compartment. The operator drives standing, the brake lever pedal being under his foot and arranged so that the truck stops automatically if the operator steps off while the machine is running.

Standard automotive construction has been adhered to wherever possible so that the machine can be serviced by any automobile or truck mechanic. A feature emphasized by the maker is the provision made for accessibility, the hinged hood permitting ready inspection of the engine, and, when necessary, the machine can be stripped down to the chassis in less than 20 min.

U. S. Cast Iron Pipe & Foundry Co. Makes Small Profit

The annual report of the United States Cast Iron Pipe & Foundry Co. shows that for the year 1921 the net profit was $100,841 compared with $851,592 for 1920. President Lemoine says that when one considers the serious depression in iron and steel so much in evidence throughout 1920 with drastic readjustments so patent in many directions reflected by heavy losses reported by many corporations, it is pleasing to record even this small net for the year. He adds that with the turn of the year the general situation improved and the outlook is brighter.

"Perhaps the most notable event of the year holding promise for the future," says President Lemoine, "was the acquisition during the latter part of 1921 of the sole rights for the United States to the de Lavaud process (for casting centrifugally cast iron pipe), which has attracted much attention in this country and abroad. In some respects the process is revolutionary. Its development offers opportunity for expansion into fields hitherto untouched by and without the realm of ordinary cast iron bell and spigot pipe. By this process it is possible to produce a lighter and stronger pipe adapted to service in natural gas, oils and irrigation lines, to say nothing of piping for high pressure gas and water, the piping of power houses and buildings, etc. It is now planned to equip gradually, as the demand warrants, for sizes 4 to 12 in. diameter, allowing larger sizes to come as a possible development. It is not expected that this pipe will immediately, though it may ultimately, replace the smaller sizes of ordinary sand cast bell and spigot pipe. It is thought, however, that it will find its way into the wider fields referred to in which the lighter and stronger pipe is desirable."

At the annual meeting of the Colorado Fuel & Iron Co., Kingdon Gould and E. H. Weitzel were made directors, succeeding D. H. Taylor and W. Ward of New York. Mr. Taylor was the Gould representative on the board. Mr. Weitzel of Pueblo is general manager. The other directors were re-elected. There were no changes in the principal officers.

Design of Open-Hearth Furnaces

Regenerator and Flue Calculations for Frictional Resistance to Passage of Air and Gases— Summation of Losses

BY A. D. WILLIAMS*

FRICTIONAL resistance in the checkers can be approximated by the formula of Mojarow, which is also used in arriving at the frictional resistance of the flues and other passages through which the air and gas pass. This formula is:

$$F = m \frac{SL}{A} v_t p_t$$

in which:

F = the frictional resistance expressed as inches of water or, if the metric system is used, millimeters of water or kilograms per square meter;
m = coefficient of friction as determined by Mojarow = 0.003076 (or, for metric values, 0.016). This coefficient was determined by observation on Cowper stoves. Murge determined a coefficient for mine galleries of one-third this value, or 0.001026;
S = perimeter of the passage or passages through which the gas flows;
L = length of the passage or flue;
SL = total wall surface of the passage or flue;
A = sectional area of the passage or, where this varies, the mean sectional area;
v_t = average velocity of flow per second, at $t°$;
p_t = specific weight of a unit volume of gas at $t°$;
$t°$ = average temperature of the flowing gas in the section examined.

Regenerator Computation

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
Friction in Checkerwork:				
SL = Heating surface, sq. ft. =	24,675	45,830	.....	.....
A = Area of passes, sq. ft. =	118.63	228.51	.....	.....
$SL \div A$ = hydraulic radius =	208	200.5	.....	.....
v_t = Velocity, ft. per sec.	6.53	4.93	8.24	4.97
p_o = Weight, lb. per cu. ft.	0.0702	0.0805	0.0824	0.0824
t = average temperature, Deg. Cent.	850	750	1,200	1,100
Deg. Fahr.	1,562	1,382	2,192	2,012
$1 + at$ for average t =	4.120	3.753	5.404	5.037
$p_t = p_o \div (1 + at)$ = lb. per cu. ft. =	0.01704	0.02145	0.01543	0.01636
m = coefficient of friction =	0.003076			
Frictional loss, inches of water F				
0.003076 × 208 × 6.53 × 0.01704 =	0.0712	.....	.....	.....
0.003076 × 200.5 × 4.93 × 0.0215 =	.....	0.0654	.....	.....
0.003076 × 208 × 8.24 × 0.01543 =	.....	.....	0.0814	.....
0.003076 × 200.5 × 4.97 × 0.01636 =	.....	.....	.....	0.0501

As the gases leave the checkerwork they make a 90-deg. turn, and the same when they enter the checkers. It is, therefore, necessary to provide the pressure to impress the velocity through the checkerwork upon the gases. The pressure in inches of water required for this purpose is:

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
$H = 0.19245\ p_t (v^2 \div 2g)$ =	0.00217	0.001558	0.003131	0.001139+
Calculations for regenerator chambers:				
Width of chamber..... Some allowance must be made in both width and length for expansion of brickwork.	113.75	211.25 in.	....	.....
Thickness of walls.....	4.5 in.	....	.....	.....
Flue width in clear....	18.25 in.	= 1.52 ft.		
Number of flues.....	5	9	.....	.....
Number of walls.....	4	8	.....	.....
t = temperature below checker, Deg. Cent...	500	300	800	600
Deg. Fahr...	932	572	1,472	1,112
$1 + at$ = gas factor...	2.835	2.101	3.936	3.202
Q_o = volume, std. conditions cu. ft.....	188	300	181	270
$Q_t = Q_o (1 + at)$ = cu. ft.	533	630	712	865
B = total width of flues, ft.	6.08	12.16	.....	.....
H = height of flues, ft.	3.50	.....	.....	.....
$A = B \times H$ = area of flues, sq. ft.....	21.28	42.56	.....	.....
S = total perimeter, flues, ft.	33.16	59.32	.....	.....
L = total length of chamber, ft.	27.29	.....	.....	.....
SL = wall surface, sq. ft.	905	1,619	.....	.....
$SL \div A$ = hydraulic radius = ...	42.53	38.04	.....	.....
p_o = specific weights..	0.0702	0.0805	0.0824	0.0824
$p_t = p_o \div (1 + at)$ = lb. per cu. ft.....	0.0248	0.0383	0.0209	0.0257
$v_t = Q_t \div A$ = ft. per second	25.05	10.62	33.46	14.58
F = inches of water...	0.0271	0.0159	0.0305	0.0146+

The resistance to flow is approximately equal to the full volume flowing one-third the length L.

$$F = m \frac{SL}{A} v_t p_t$$

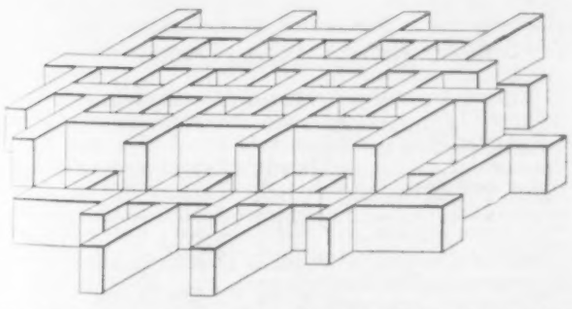


Fig. 5. Method of Laying Up Checker Brick in Regenerator Chambers

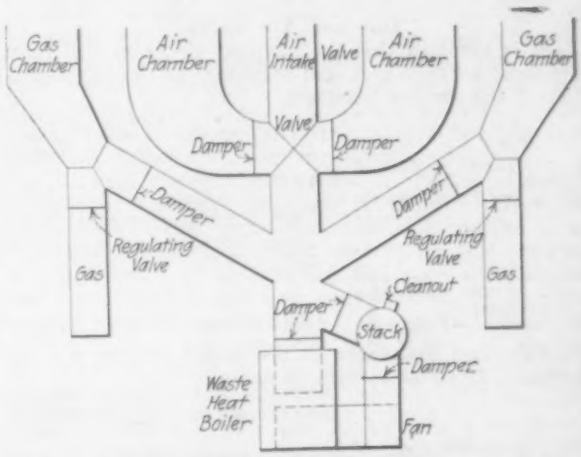


Fig. 6. Schematic Layout of Regenerators, Flues, Dampers, Valves, Waste-Heat Boiler and Stack

The space required in the chamber above the checkerwork may be determined by the formula of Yesmann, which is in metric units. This formula was used in obtaining the height of the heating chamber. For the case in hand:

*Box 92, Newark, N. J. This is the third of a series of five articles on Open-Hearth Furnace Design. The first appeared at page 577, March 2; the second, at page 717, March 16.

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
t = temperature of gases, Deg. Cent.	1,200	1,200	1,600	1,600
Deg. Fahr.	2,192	2,192	2,912	2,912
$1 + at$ = gas factor	5.404	5.404	6.872	6.872
Q_o = volume of gases, cu. ft.	188	300	181	270
$Q_t = Q_o (1 + at)$: Cu. ft.	1,016	1,621	1,244	1,855
Cu. m.	28.77	45.91	35.23	52.53
Q_t^2 =	827.8	2,108	1,241	2,759
B = width of chamber: Ft.	9.48	17.60	.....	.....
Meters	2.89	5.37	.....	.....
B^2 =	8.35	28.84	.....	.....
$B^2 t$ =	10,020	34,610	13,360	46,150
$X = \sqrt[3]{Q_t^2 \div B^2 t}$ =	0.4356	0.3935	0.4529	0.3909
A = coefficient =	3.36	3.56	3.36	3.56
$h_t = A X$ = Height in meters =	1.525	1.401	1.522	1.392
Height in feet =	5.00	4.59	.....	.....
This distance is the height from the top of checker to center of gravity of arch segment.				
Rise of arch over chamber, in. =	9.5	18.63	.....	.....
Height to skewbacks, ft. =	4.50	3.64	.....	.....
Height to arch at center, ft.	5.29	5.29	.....	.....

Height of flues below checker, ft	3.50
Height of checkerwork, ft	23.00
Height to soffit of arch, ft	5.29
	31.79
Height arch to port sill, ft	10.21
Height between levels, ft	42.00

The frictional resistance to flow is approximately equal to the full volume flowing one-third the length L,

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
$S = (2 \times 5.00) + (2 \times 9.50)$ =	29.00	.....	.....	.....
$S = (2 \times 4.64) + (2 \times 17.60)$ =	.....	44.48	.....	.....
L = length of chamber, ft. =	27.29	.....	.....	.....
SL = wall surface, sq. ft. =	791.4	1,214	.....	.....
A = sectional area, sq. ft. =	47.50	81.67	.....	.....
$SL \div A$ =	16.66	14.47	.....	.....
$v_t = Q_t \div A$ = ft. per sec.	11.22	7.71	14.99	10.59
$p_t = p_o \div (1 + at)$ = lb. =	0.01299	0.0149	0.01199	0.01199
F = in. water friction loss =	0.0008	0.0006	0.0007	0.0006+
Chimney effect of checkers and uptakes: net H = 40 ft.				
$d = 0.19245\ H\ (p_{air} - p_{gas})\ d$ inches of water.				
t = average temperature, Deg. Cent.	850	750	1,200	1,100
Deg. Fahr.	1,562	1,382	2,192	2,012
p_{air} = lb. per cu. ft.	0.0805	.....	.....	.....
$p_{gas} = p_{air} \div t'$.	0.0170	0.0215	0.0154	0.0164
$p_{air} - p_{gas}$ =	0.0635	0.0590	0.0651	0.0641
d = inches of water column	0.4887	0.4541	0.5011	0.4934—

Gas and Air Necks

It is assumed that the gas and air necks will have the same average area and perimeter as the upper portion of the checker chambers.

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
L = length in feet of neck =	12.25	13.25	.....	.....
SL = wall surface, sq. ft. =	355	590	.....	.....
A = sectional area, sq. ft. =	47.50	81.67	.....	.....
$SL \div A$ =	7.474	7.224	.....	.....
v_t and p_t are the same as in the preceding computation.				
F = in inches of water =	0.0034	0.0026	0.0041	0.0028+

Frictional resistance in the cinder pockets will be assumed as equal to that in necks.

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
For the uptakes Q_t in cu. ft. =	1,016	1,621	1,244	1,855
A = uptake area sq. ft. =	21.65	50	.....	.....
n = number of uptakes =	1	2	Circle	Square
v_t = velocity, ft. per sec. =	46.92	32.42	57.46	37.1
S = perimeter, ft. =	16.50	40.00	.....	.....
L = height, ft. =	13.21	.....	.....	.....
$SL \div A$ =	4.647	10.568	.....	.....
p_t = specific weight, lb.	0.01299	0.0149	0.01199	0.01199
F = friction in. water column	0.0087	0.0016	0.0098	0.0014+
$H = 0.19245\ p_t\ (v^2 \div 2g)$ = velocity pressure, in. water =	0.0855	0.0468	0.1183	0.0494+

Frictional resistance of the fantails for gas and air:

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
t = average temperature, Deg. Cent.	500	150	800	600
Deg. Fahr.	932	302	1,472	1,112
$1 + at$ = gas factor =	2.835	1.551	3.936	3.262
$Q_t = Q_o \times (1 + at)$ = cu. ft.	533	465	712	865
$p_t = p_o \div (1 + at)$ = lb.	0.02476	0.0519	0.02094	0.02573
S = perimeter (average) = ft.	22.0	34.0	.....	.....
L = length (average) ft. =	16.0	19.0	.....	.....
A = average section, sq. ft. =	32.00	57.00	.....	.....
$SL \div A$ = hydraulic radius =	11.0	11.33	.....	.....
v_t = average velocity, ft. per sec.	16.66	8.16	22.25	15.18
F = friction, inches of water =	0.0140	0.0146	0.0157	0.0135
H_1 = velocity, inches of water =	0.0205	0.01032	0.03093	0.01772
v_t = velocity below checker =	25.05	10.62	33.46	14.58
H_2 = velocity, inches of water =	0.0465	0.0129	0.0584	0.0163
$H_2 - H_1$ = additional to increase velocity = inches of water =	0.0260	0.0026	.....	.....
v_t in necks, cinder pocket and above checker = ft. per sec.	11.22	7.71	14.99	10.59
H_3 = pressure to impress this velocity, inches of water =	0.00489	0.00265	0.00805	0.00402

Flues Between Valves and Stack

	Stack Flue to Boiler or Stack	Stack Flue from Gas Valve	Stack Flue from Air Valve
t = average temperature, gases in flue, Deg. Cent.	630	750	550
Deg Fahr.	1,166	1,382	1,022
$1 + at$ = gas factor for average t =	3.312	3.7525	3.0185
$Q_t = Q_o \times (1 + at)$ = cu. ft.	1,494	880	815
$p_t = p_o \div (1 + at)$ = lb. per cu. ft.	0.0249	0.0220	0.0273
A = area of flue, sq. ft. =	60.00	36.00	33.00
$v_t = Q_t \div A$ = average velocity, ft.	24.90	24.44	24.70
L = length of flues in feet =	20.00	25.00	16.00
S = perimeter of flue in feet =	32.00	24.00	23.00
$SL \div A$ = hydraulic radius =	10.67	16.67	11.15
F = friction in inches of water =	0.0203	0.0276	0.0239+
H = pressure for velocity, in. of water =	0.0461	0.0393	0.0498+

Valve Resistance

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
Valve, nominal size in inches =	54	66	54	66
A = area in sq. ft. =	15.90	23.76	15.90	23.76
t = temperature at valve, Deg. Cent.	500	50	750	550
Deg. Fahr.	932	122	1,392	1,022
$1 + at$ = gas factor	2.835	1.1835	3.7525	3.0185
$p_t = p_o \div (1 + at)$ = lb.	0.02476	0.06805	0.0220	0.0273
$Q_t = Q_o \times (1 + at)$ = cu. ft.	533	355	880	815
$v_t = Q_t \div A$ = ft. per sec. =	33.52	14.94	55.34	34.38
As this velocity must be created twice, due to 180 deg. bend in valve.				
$H = 2 \times 0.19245\ p_t\ (v^2 \div 2g)$				
H = velocity pressure, in. of water	0.1663	0.0908	0.4627	0.1929+

Summation of Losses

All values in inches of water

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
Pressures Required for Impressing Velocity				
Uptakes	0.0855	0.0488	0.1183	0.0494
Cinder pockets	.....	.....	0.0081	0.0040
Chamber above checker.	0.0049	0.0027	.....	.....
Checkerwork	0.0022	0.0016	0.0031	0.0011
Flues below checker	0.0260	0.0026	0.0584	0.0163
Fantails	0.0205	0.0103	.....	.....
H_1 between valves and ports	0.1391	0.0660	0.1879	0.0708
Friction Losses				
Uptakes	0.0087	0.0016	0.0098	0.0014
Cinder pockets	0.0034	0.0026	0.0041	0.0018
Necks	0.0034	0.0026	0.0041	0.0028
Chamber above checker.	0.0008	0.0006	0.0007	0.0006
Checkerwork	0.0712	0.0654	0.0814	0.0501
Flues below checker	0.0271	0.0159	0.0305	0.0146
Fantails	0.0140	0.0146	0.0157	0.0136
F_1 between valves and ports	0.1286	0.1033	0.1463	0.0849

	Gas on Gas	Air on Air	Gas on Waste Gas	Air on Waste Gas
H_2 Valve resistance.....	0.1663	0.0908	0.4627	0.1829
F_2 Friction waste gases	.....	.....	0.0276	0.0239
H_3 Velocity pressure of waste gases in flues..	.....	.....	0.0393	0.0498
F_3 Stack flue friction...			0.0203	
F_1 Chimney effect of checkers, etc.	0.4887	0.4541	0.5011	0.4934
F_2 Friction between valves and ports.....	0.1286	0.1033	0.1463	0.0849
F_2 Friction waste gas flues	.....	.....	0.0276	0.0239
	0.1286	0.1033	0.1739	0.1088
Pressure for velocity H_1	0.1391	0.0660	0.1879	0.0708
H_2 Valve resistance....	0.1663	0.0908	0.4627	0.1829
H_3 Flue gas velocity...	.....	.....	0.0393	0.0498
	0.4340	0.2601	0.8638	0.4123
F_1 Chimney effect of checkers	0.4887	0.4541	0.5011	0.4934
Available for port velocity	0.0547	0.1940	.....	.....
Draft depression required	.....	.....	1.3649	0.9057
pressure available for port velocity will be increased by	0.0857	0.0689	.....	.....
The draft depression reduced by	.....	.....	0.0975	0.0566
Available for port velocity	0.1404	0.2629	.....	.....
Depression required.....	.....	.....	1.2674	0.8491

If Murge's coefficient of friction is used, the

The value for the coefficient of friction determined by Mojarow, in his investigation of the Cowper stove, is probably too high when used for large, comparatively straight gas passages. Murge found the coefficient of friction in mine galleries, at ordinary temperatures, to be but one-third that determined by Mojarow. The values of Murge are probably more accurate, as an extended series of observations was available. A further verification of the conservatism of these values is given by the fact that the investigation of some furnaces gives negative results, that is to say, the computations indicate the necessity for forced draft. Nevertheless, the furnaces are in operation without forced draft, but in a more or less defective manner, for they give operating trouble and their campaign or run is shorter than normal.

Manufacture of Stainless Steel Cutlery*

Forging, Heat Treatment, Grinding and Finishing—Proper Chemical Composition—Stainless Tests

I HAVE read a great mass of information compiled by several engineers as to the general characteristics of stainless steel for cutlery. I shall not attempt to discuss their opinions upon this particular steel for cutlery as they see it, but I will give instead the information as it has been worked out successfully at the fire and wheel.

I have found great difficulty in studying the data, as submitted by different authorities, as there seems to be a great divergence of opinion as to practically all essential points, including the exact chemical specifications, and a very wide range of opinion as to the subsequent handling and heat treatment of this steel.

Proper Chemical Composition

In enumerating these experiments, I shall not attempt to segregate them under separate headings but simply give them to you in abstract form. As to the analysis for cutlery, I would recommend the carbon content to be between 0.30 and 0.45 per cent and the chromium between 13 and 15 per cent. Dr. Hatfield recommends 13 per cent. The Brearley patents call for chromium between 9 and 16 per cent, while Elwood Haynes has covered in his patents up to 16 per cent. It is, however, the opinion of the writer and others that nothing is gained in stainless characteristics or corrosion by exceeding 15 per cent chromium. Phosphorus and sulphur should be below 0.03 per cent with silicon and manganese about 0.30 and 0.50 per cent respectively.

The steel generally used for cutlery is bought in round rods in convenient lengths to handle according to methods used in its manufacture. Some companies work this steel from the bar while others fabricate it to the desired lengths. The writer prefers the latter method because of its convenience and its economy as to scrap.

Great care should be used in this method with reference to the tools used in the fabrication because the cutlery troubles begin at this point. The steel should always be kept well annealed and, if the tools are kept sharp, there should be no difficulty in cutting to the desired lengths. Dull tools at this point have a tendency to tear off the steel whereby small cracks are started in the end of some of the pieces which generally lead to seamy portions in the blades. Steel manufacturers are often blamed for seamy stock when in reality the trouble has been due to dull tools. I might say right here that, in the early stages of this steel for cutlery, great difficulty was experienced at the mills in manufacturing this steel free from seams, but to-day I believe this has been reduced to a minimum.

The Drop Forging Operation

After the steel is cut into the desired lengths it is taken to the drop forging room, where it is forged into the desired shape, and from there it passes on to the rolls where the blade is rolled out. Great care must be taken in these operations to keep the heat at its proper forging temperature, especially at the roll, because at this point a part of the blade has nearly reached its desired thickness while the remainder of the piece is still in its original round shape. The heat generally used at these stages of the manufacture ranges from 1650 deg. to 1750 deg. Fahr.

The work must be kept as free as possible from oxidation because any scale rolled into the steel at this time may form a seat of corrosion even after the blade has been finished. When working with small thin sections, never allow it to cool on a damp, cold floor, on account of the air hardening qualities of this steel. Strains will be set up which will later develop into cracks, thus rendering the blade useless.

The next step in the manufacture is the annealing operation. The work is usually put into a receptacle and brought slowly up to about 1380 to 1400 deg. Fahr., generally in a muffle furnace, after which it is allowed to cool slowly. From here the blades are blanked out into the desired shapes and great care should be used at this point to see that the tools are kept sharp at all times, thus reducing the possibilities of cracks. These cracks caused by dull tools are not seen at this particular point, and sometimes do not show up until considerably more labor has been expended.

Hardening and Tempering

The next step is the hardening operation, which is one of the most difficult in the making of the whole knife. The hardening and tempering of stainless steel have much to do with its stainless characteristics, so great emphasis should be placed on its proper handling.

Stainless steel may be hardened in air, oil or water; the quenching temperature really depends on the method used. In my opinion, it should always be done in oil from a temperature ranging between 1650 to 1900 deg. Fahr., depending on the carbon and chromium

*From a paper read at the first sectional meeting of the American Society for Steel Treating in New York, March 3. The author, R. G. Hall, is research engineer, R. Wallace & Sons Mfg. Co., Wallingford, Conn.

content of the steel. Most low carbon steels in a hardened and undrawn condition have a low elastic limit and one rather indefinite. It is only after drawing that a definite elasticity is established. Tests have shown that the elastic limits increase for a time with the drawing temperature in stainless steel and then begin to fall off like any other steel as the drawing temperature increases. Time limit enters into this phenomenon to a very large extent. A properly hardened blade must be drawn long enough to relieve the internal strains, but this change must not be too speedy.

The tempering colors appear in stainless steel at about twice the temperature of ordinary steel and are not altogether reliable, so I am firmly convinced that the temper should be drawn to a definite temperature in a salt bath or an electric furnace.

The Grinding Process

The blades thus hardened and tempered are taken next to the grinding machines to be ground to the desired thickness and then tapered properly. Here extreme care should be taken not to force this operation on account of the steel being unusually fine grained, thus being very susceptible to that characteristic which the cutters call the grinder's scorch. This particular kind of scorch polishes off very easily, but at the same time renders the steel, directly under the scorch, quite susceptible to stain, which characteristic must be avoided at all times.

If any oxidation has taken place during previous operations, care should be taken at this point to see that it is thoroughly ground out, for, as I have said before, any scale, no matter how small, will form a seat of corrosion which will invariably pass the inspectors and seldom show up until after the knives have been in use for a period of time. Following the grinding operation, the blades are tested for temper or in other words must stand an elastic limit of 1 to 5 in. Stainless steel to be used for cutlery and to be in the most perfect condition should show a Brinell hardness between 525 and 530.

After the tempering test, the blades are glazed to remove all coarse grinding marks, and this operation, while simple, requires an extra amount of work with a different grade of emery from that required for ordinary carbon steel. The knives are next taken to the inspection room, where they are inspected to see if the glazers have removed all coarse grinding marks.

The blades are then sent to the finishing room, where the blades are mounted in handles. Here the backs, rims, points, bolsters and necks are finished. The blade is then given the final glaze and any other finishing touches needed to make it a first-class knife.

Tests for Stainless Qualities

The knife then goes to be tested for stainless qualities and if the blade is found to stain or copper plate after a two-minute test with a concentrated solution of copper sulphate, the knife is rejected. After passing this test they are etched and passed to the stock room ready for shipment.

The reagents for grading stainless steel are as follows:

1. *Copper Sulphate*
   4 grams $CuSO_4$
   18 grams H_2SO_4
   90 grams H_2O
   Time: 6 minutes.
2. *Ordinary Writing Ink, Pomeroy and Signet*
   Time: 3 minutes.
3. *Nitric Acid*
   Specific gravity 1.20.
   Time: 2 minutes.

It might be interesting to some to show the results of some of the different stainless steels which have found their way into the market. I have endeavored to take steel with wide differences in their chemical composition as to the two principal elements, carbon and chromium. These samples were all forged at about 1700 deg. Fahr. and were hardened at different quenching heats according to their analysis, the quenching ranging from 1500 to 1900 deg. Fahr. These samples were all confirmed by three tests made up of concentrated solutions of acetic, tartaric and hydrochloric acids. The tests are as follows, viz:

Steel No.	Carbon	Chromium	Stained in Minutes	Cutting Efficiency
1	0.30	11.93	28	O. K.
2	0.26	12.21	35	Fair
3	0.40	13.60	13	O. K.
4	0.31	15.90	75	O. K.
5	1.10	23.32	43	Very Good

While there are some 40 operations through which these blades pass during their manufacture, I have simply endeavored to touch the high spots, which I trust will give you some idea of how this latest development in cutlery is manufactured.

In summarizing, it will be seen that the manufacture of a stainless steel blade, while not materially different in shape or size from that of an ordinary carbon steel blade, in that the wear and tear on tools, furnaces, fires, extra operations, and rejections together with the extra price of stainless steel, which is seven or eight times the price of good carbon steel, makes the blade a very costly article.

Improvement in Bridgeport District

Thirty-one manufacturing companies in Bridgeport, engaged mostly in metalworking lines, which report to the Manufacturers' Association of Bridgeport, have shown a steady gain in activity since early in January. The improvement really dates from Oct. 1, 1921, but there was a falling off in the early part of January, probably due to shutdowns for inventory at that time.

For the week ended March 11 the reports show that the 31 manufacturing plants were working at an average of 54.9 per cent as regards the number of employees and at 48.5 per cent as regards the number of man hours. The basis taken as 100 per cent was not the maximun number of men employed during the war boon, but what the various manufacturers estimated they would be doing to-day under normal condition of business.

The estimated normal number of employees for the 31 factories is 25,318, working an average of 49 hr. per week, or a total of 1,240,582 man hours. During 1921 the highest point reached was in the week ended March 5, when 71 per cent of the normal number of employees were engaged and the percentage of man hours was 60.4. From that date there was a steady decline, the low point being reached in August and September. While the first three months of this year, so far as recorded, are about on a par with the last three months of 1921 as to the number of workmen engaged, there has been an increase in the number of man hours, the week ended March 11, for example, showing a gain of 3 per cent in this respect over the preceding week.

Similar data collected by the Manufacturers' Association of Connecticut, Inc., relating to the manufacturing districts of Ansonia, Derby, Shelton, Seymour, Bridgeport, Bristol, Danbury, Hartford, Middletown, New Britain, New Haven, Southington, Stamford and Waterbury, has not yet been completed for February, but the January figures show an average industrial activity of 63.6 per cent (calculated in man hours) for that month, while the number of workmen engaged was 72.5 per cent of the normal number. It is noted that the average weekly operating schedule during a normal period is 52.3 hr. per week, while in January the average schedule was 45 hr.

Joint Meeting of Machinery Dealers and Manufacturers

In connection with the Birmingham convention of the Southern Supply and Machinery Dealers' Association, and American Supply and Machinery Manufacturers' Association, it has been decided to hold a joint executive session of the two associations on the morning of Tuesday, April 25, for discussion of business subjects of mutual interest.

The dealers have requested that the following subjects be listed for consideration at that session: Business Situation, Freight Allowances, Distribution, Terms, Standardization.

The Manufacture of Brass Forgings

Called Also Die Pressing or Hot Forging—Details of a Process Developed in the United States During the War—Physical and Other Properties

BY C. T. RODER*

THE method of forging brass was developed in Germany and Great Britain about 1900. The procedure is called stamping, although the work is formed under a power press. In this country the term forging or die pressed casting is used, as our interpretation of stamping is something cut from sheet metal by the use of a die.

It was not until the early stages of the war that brass forgings were commercialized in the United States. Our Government realized the unnecessary and costly wastage of cutting and machining shrapnel parts such as time, graze and percussion fuses from raw stock, and therefore called upon American manufacturers for assistance. Many responded to the call, among which were the Mueller Metals Co., Port Huron, Mich., and also its sister plant, the H. Mueller Mfg. Co., Sarnia, Ontario. Thus, in the development of brass forgings, a tremendous saving was effected for both the Government as well as the manufacturer.

It can be said that the forging of brass is the highest type of the metal craftsman's skill. There are some machined parts which can accomplish their purpose only when forged. Requisites, such as high tensile strength and metallic density, as required in oxygen gas valves, are found only in brass forgings, due to their resistance to great pressure.

Description of the Process

The process of forging brass is to heat a pill or slug, which has been cut from extruded rod to a suitable shape, in a specially constructed furnace which is open at both ends. The pill is heated to a cherry red heat, which on the average is approximately 1300 deg. Fahr. The temperature of the pill varies depending upon the size and construction of the piece to be forged.

The presses are usually operated continuously and require one operator at the press, while a tender or helper feeds the pill into the press. In addition to this there is a furnace tender who regulates the heat and keeps the furnace filled with pills. The ordinary small shapes are forged under 400,000 lb. pressure. However, presses are used having capacities up to 400 and 600 tons. With a 200-ton capacity press it is not practical to undertake the forging of a shape over 4 in. in diameter. With the continuous operation of a press and a skillful operator, large production can be obtained and one press can average 5000 and up to 10,000 forgings per day.

Types of Presses Used

Two types of presses are used, single and double action. Small forgings of simple design, where the metal does not have to flow far, are produced in a single action press. Where the shape is unusually intricate and where it is necessary for the metal to flow over a long distance, double action presses are used. The functioning of the first stroke of the press is merely the closing of the lower die which holds firmly the heated blank and prevents more or less fin or flash. The second stroke might be termed an extrusion operation, and its function is to produce the completed forging.

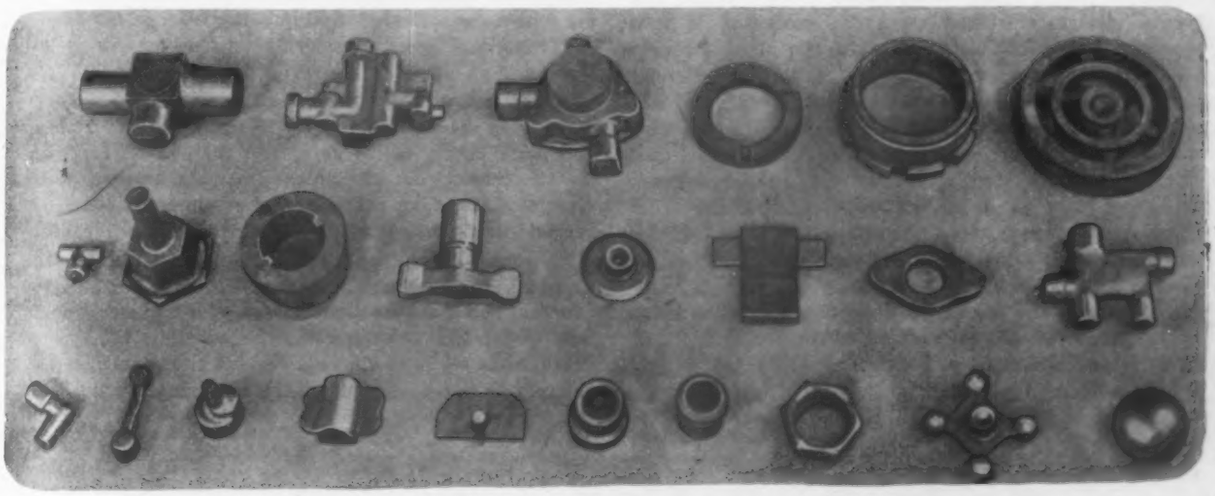


Fig. 1.—A Collection of Brass Forgings Showing the Possible Range of Work

The accompanying illustrations of forgings, which have been successfully manufactured by the Mueller Metals Co., indicate the possibilities of commercial work by this process. Fig. 1 shows a collection of forgings illustrating the wide range of work possible. Fig. 2 shows a group of parts arranged to illustrate the three stages of forging operations. Insert "A" is the blank metal, pill or slug; second, the shape or forging as it leaves the die, a portion of which is surrounded with what is known as flash, a characteristic in forging; third, the completed rough forging after having gone through a trimming operation in a trimming press.

It sometimes is practical to extrude a specially shaped pill or slug, which in its crude form is an approach to the finished shape of the forging to be made, as in inserts "F" and "G," in Fig. 2. The special ex-

*Port Huron, Mich.

truded shape has a great similarity to that of the finished forging.

Brass forgings are 80 per cent stronger than sand castings, the physical properties comparing as follows:

	Brass Forgings	Sand Castings
Tensile strength, lb. per sq. in.	55,000	30,000
Yield point, lb. per sq. in.....	28,000	15,000
Elongation, per cent.....	30	20

The writer knows of instances where forgings have been made to equal a tensile strength of 105,000 lb. per sq. in., this being accomplished by a special mixture of metals. Dimensions can be held to 0.005 in. on diameters and 0.010 in. on lengths. Such operations as buffing, polishing and nickel plating are held to a minimum on account of the smooth surfaces and freedom from scale. Tools last much longer and turning speeds on machines are faster than is possible on sand castings. On account of the great pressure under which they are made, the result is a metal fine grained as tool steel.

Probably the most noteworthy advantage secured in forgings is the saving of high priced metal and the elimination or minimizing subsequent machine work, which represents a great saving in labor costs. It is readily seen that the process of forging provides a density through which there can possibly be no seepage, no porosity; the metal also has additional strength.

Construction of the Dies

The most important and fundamental element involved in the forging brass is die construction. The general design, workmanship and composition of steel used are the underlying features in the utility of such a die. Economy lies in the use of a high-speed tungsten steel for the actual section of the forming die, due principally to the high temperature under which they operate. Other portions, such as the die block or subsidiary parts, usually are made from a cheaper grade of carbon steel and, in many cases, machine steel. Some mnufacturers have adopted a non-shrinking die steel but, as it is more or less experimental, it is not used to any extent.

The life of the die varies depending upon the shape of the piece. Some dies can be used for 10,000 to 20,000 castings and others up to 50,000 and 60,000. The most skilful tool and die makers must be used in forging die construction, as an error in the laying out or even a slight difference in design results in success or failure. One of the important points in construction is allowances for shrinkage and proper venting to eliminate air pockets.

The latter is very important, as its functioning deals with the free flowing of the metal. Very small holes are usually used, which permits the escape of air and, while small tips or flash result from same, they are easily broken off or are forced out through pressure of the succeeding stroke. Considering the heat to which dies are subjected through the continuous insertion of the heated pill or plug, also the cooling which takes place, it can be easily seen that the die is subjected to extreme wear. However, with the continual application of oil to each stroke, this condition is held to a minimum.

It is obvious that the forging process will, in a decade or two, supplant practically all parts now being cast in sand or machined from bar stock, providing such parts are used in quantities. It, of course, is not advisable to adopt the use of forgings unless the requirements are such as to warrant the initial outlay for die and tool equipment, which is usually two or three times greater than pattern equipment.

Probably the largest users of forgings to-day are automobile manufacturers. The reader must appreciate that the process is comparatively new. In a few years brass forgings will be in great demand, particularly those consumers who require the assets of a forging which cannot be secured in sand casting.

There has been considerable discussion as to the correct application of the term, brass forgings, to this new and important process. A great many writers term it as die-pressing or hot forging, either of these two being more logical as a title than brass forgings, for the reason that the finished part is brought about from the use of an extruded rod or shape, it being hot forged or die pressed. The term die-pressed casting is misleading and unfair to manufacturers of this product. In speaking of the word "forging," one thinks of metal being shaped under blows of a hammer, and as this is not the true process, the question remains in doubt as to what would be a correct title, which is left entirely to the discretion of the individual.

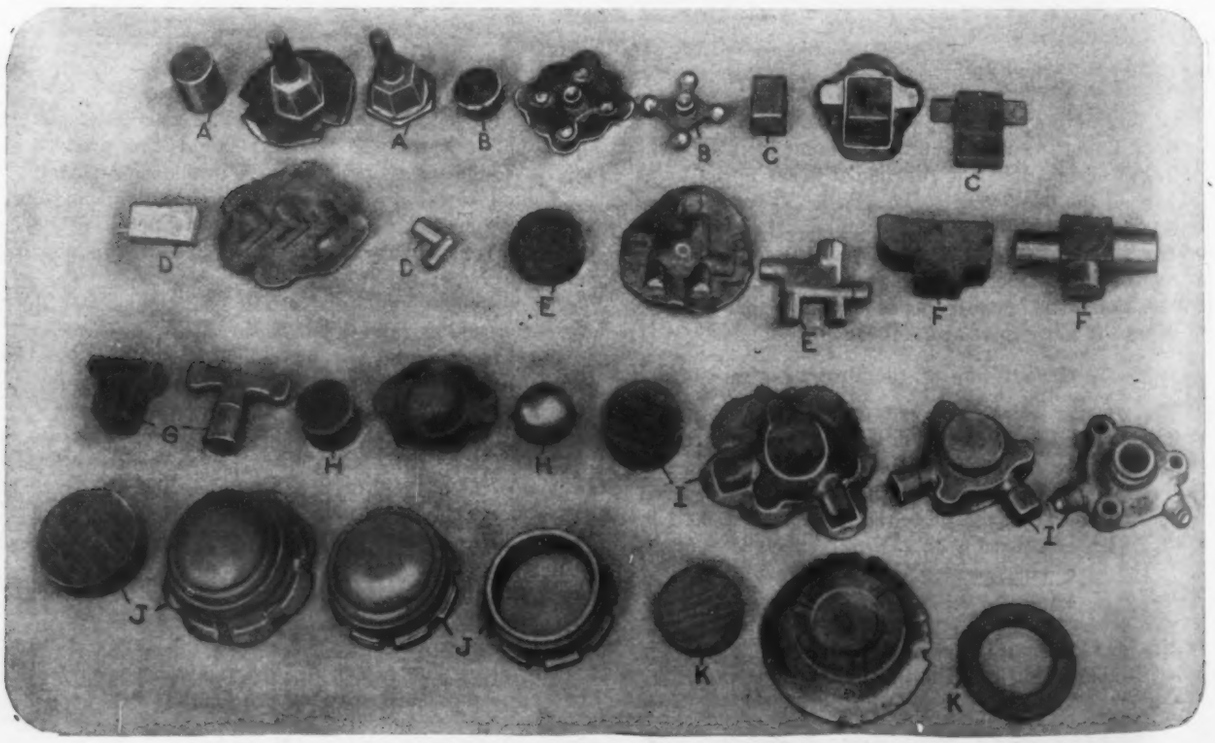


Fig. 2.—A Group of Parts of Brass Forgings Arranged to Illustrate the Three Stages of Forging Operations

NEW YORK CENTRAL OPENING

Railroad Receives Bids on Large Number of Steel Products

The New York Central Railroad had a public opening of bids on steel products on Wednesday, March 22, at the office of W. C. Bower, general purchasing agent in New York. The material advertised for included several thousand tons of plates, shapes, bars, sheets, bolts, track material, axles, fabricated bridge material, seamless tubes, etc. Some of the bids submitted by various companies follow:

Interstate Iron & Steel Co., Chicago.—Standard wire nails, $2.80 per 100 lb. keg, base, Chicago; galvanized fence staples, $3.45 per 100 lb., Chicago; polished fence staples, $2.95 per 100 lb., Chicago; steel bars, 1.65c., base, Chicago.

Pittsburgh Forge & Iron Co.—Car and tender axles, rough turned, 2.25c.; car axles for axle light system, rough turned, 2.45c.; driving and trailer truck axles, 3.25c.; front engine truck axles, 2.75c., all per lb. f.o.b. Youngstown.

Falcon Steel Co.—Black sheets, No. 28 gage, 3c.; galvanized, No. 28 gage, 4c.; blue annealed, No. 10 gage, 2.15c., No. 14 and lighter, 2.25c., all per lb. f.o.b. Youngstown.

Bourne-Fuller Co.—Track bolts, oval neck, not heat treated, 2.75c.; heat treated, 3.75c.; another type of oval neck bolts, 4.65c. for non-heat treated and 5.65c. for heat treated; square neck track bolts, 2.75c. for non-heat treated and 3.75c. for heat treated; extras on the first item, $1 per 100 lb. for lengths under 4 in., on second item, 50c. per 100 lb. for lengths under 4 in., and on the third item no extra; black sheets, No. 28 gage, 3.10½c.; galvanized sheets, No. 28 gage, 4.10½c.; blue annealed, 2.35½c.; bars and shapes, 1.60½c. all per lb. f.o.b. Cleveland; billets, $36, Cleveland.

Jones & Laughlin Steel Co.—Bars, shapes and plates, 1.60½c. per lb., Youngstown; standard wire nails, $2.40 per 100 lb. keg; galvanized fence staples, $3.05 per 100 lb.; polished fence staples, $2.55 per 100 lb., delivered Youngstown; steel billets, $35, Youngstown; track spikes, 2.10c. and 2.20c., according to specification, no extras; bridge material, 5.28c. per lb., delivered Lowville, N. Y.; 7.04c. per lb., delivered Philadelphia; 5.37c. per lb., delivered Bay View, N. Y.

Penn Bridge Co.—Bridge material, 7.87c. per lb., delivered Philadelphia; 4.85c. per lb., delivered Bay View, N. Y.

Cambria Steel Co.—Angle bars, 2.65½c., Youngstown; bids were submitted on driving and truck tires varying from 5c. to 7½c. per lb., delivered Newberry Junction; axles, from 2.20½c. to 3.40½c. delivered Youngstown, and from 2.24½c. to 3.44½c. delivered Mahaffey, Pa.; standard wire nails, $2.50½ per 100 lb. keg, Youngstown; $2.57½, Mahaffey; bars, shapes and plates, 1.50c. per lb., base, Pittsburgh; billets, $34.10, Youngstown, $34.94, Mahaffey, carbon extra $1.

Oliver Iron & Steel Co.—Track bolts, 2.37c. per lb. not heat treated, and 3.57c. per lb. for heat treated on both oval neck and square neck bolts; extra 15c. per 100 lb.

Carnegie Steel Co.—Angle bars, 2.60c. per lb., Pittsburgh; blank splice bars, 2.60c. per lb., Youngstown; axles, from 2.10½c. to 3.55½c. per lb. Youngstown; bars, shapes and plates, 1.50½c. per lb., Youngstown.

Railway Steel Spring Co.—Tires, from 5c. to 7½c. per lb., Youngstown, according to specification, with an extra of ¾c. per lb. if finished bored.

American Steel & Wire Co.—Standard wire nails, $2.40; galvanized fence staples, $3.05; polished fence staples, $2.55, all per 100 lb., Farrell, Pa.

Buffalo Bolt Co.—Track bolts, both oval neck and square neck, heat treated only 3.69c. per lb., no extras, f.o.b. North Tonawanda, N. Y.

Illinois Steel Co.—Track bolts, oval head and square head, either heat treated or not heat treated, 3.30c., base, delivered Toledo, Ohio; track spikes, 2.30c., base, delivered Toledo; angle bars, 2.456c., Chicago; blank splice bars, 2.456c., Chicago; axles, 2.05c. to 3.50c., according to specification, per lb., Chicago; bars, shapes and plates, 1.50c., base, Chicago; billets, $33, base, Chicago, with $1 extra for carbon.

Erie Forge Co.—Axles, 3.30c. per lb. f.o.b. Cleveland.

Pittsburgh Steel Products Co.—Seamless tubes, 2 in., 12.25c. per ft.; 2¼ in., 13.78c.; 3 in., 28.56c; 5⅝ in., 43.86c.; 5½ in., 45.88c.; 4 in., 28.09c.; 3½ in., 22.10c.; 3 in., 20,93c.; 1¼ in. x 1 13/16 in., 26.79c.; 1⅝ x 2⅝ in., 44.82. (The variation in two prices on 3 in. tube was due to slightly different specifications.)

Edgewater Steel Co.—Tires, 5.55c. to 6.55c. per lb., according to specifications, with an extra of ¾c. per lb. if finished bored. Prices f.o.b. Homestead, Pa.

McClintic-Marshall Co.—Bridge material, 6.50c., delivered Lowville, N. Y.; 7c. per lb., delivered Philadelphia; 4.36c. per lb., delivered Bay View, N. Y. The first two items cover structural steel, castings and rollers and the third item structural steel only.

Lackawanna Steel Co.—Bars, 1.50c.; shapes, 1.60c. and plates, 1.60c., delivered West Seneca, N. Y.; billets, $33, delivered West Seneca; track bolts, 2.65c. per lb. heat treated or not heat treated, delivered West Seneca; track spikes, 2c. per lb., West Seneca, extra for copper; angle bars, 2.40c. per lb.; blank splice bars, 2.40c.

Republic Iron & Steel Co.—Billets, $31, Youngstown; bars and plates, 1.50c. per lb., Youngstown; black sheets, 3.30½c. per lb., galvanized, 4.05½c. and blue annealed, 2.30½c., all per lb., base, Youngstown.

National Bolt & Nut Co.—Track bolts, 2.85c. per lb. for non-heat treated.

Wheeling Steel Products Co.—Black sheets, 3.10½c., galvanized, 4.10½c., blue annealed, 2.35½c., all per lb. base, Youngstown; billets, $36.36, delivered Toledo, Ohio.

Alan Wood Iron & Steel Co.—Blue annealed sheets, 2.61c. per lb., base, delivered Newberry Junction; plates, 1.86c. per lb., delivered Newberry Junction.

Phoenix Bridge Co.—Bridge material, 6c. per lb. for structural steel, castings and rollers delivered Lowville, N. Y.; 7c. per lb. for structural steel, castings and rollers, delivered Philadelphia; 5c. per lb. for structural steel, delivered Bay View, N. Y.

Mount Vernon Bridge Co.—Bridge material, 7½c. per lb. for structural steel, castings and rollers, delivered Lowville, N. Y.; 7⅝c. per lb. for structural steel, castings and rollers, delivered Philadelphia; 5¼c. per lb. for structural steel, delivered Bay View, N. Y.

Reeves Mfg. Co.—Black sheets, 3c.; galvanized sheets, 4c., f.o.b. Minerva, Ohio.

Camden Forge Co.—Axles, 3.70c. per lb., delivered Newberry Junction.

Wheeling Corrugating Co. (Whitaker-Glesner Co.).—Black sheets, 3.10½c.; galvanized, 4.10½c.; blue annealed, 2.35½c., all per lb. f.o.b. Youngstown.

Donner Steel Co.—Bars, 1.50c.; small shapes, 1.50c. per lb., f.o.b. Buffalo; billets, $33, Buffalo.

Globe Seamless Steel Tube Co.—Seamless tubes, 2 in., 12.57c., Cleveland, 12.83c., Elkhart, Ind.; 2¼ in., 14.15c., Cleveland, 14.44c., Elkhart; 3 in., 29.30c., Cleveland, 29.86c., Elkhart; 3½ in., 22.62c., Cleveland, 23.09c., Elkhart; 3 in., 21.48c., Cleveland, 21.90c., Elkhart; 1¼ x 1 13/16 in., 36.95c., Cleveland, 37.43, Elkhart; 1⅝ x 2⅝ in., 61.92c., Cleveland, 62.76c., Elkhart. The two prices on 3 in. are due to slightly different specifications. All prices are per ft.

Detroit Seamless Tube Co.—Seamless tubes, 2 in., 12c.; 2¼ in., 13.50c.; 3 in., 28c.; 5⅝ in., 43c.; 5½ in., 45c.; 4 in., 27.45c.; 3½ in., 21.60c.; 3 in., 20.50c.; 1¼ x 1 13/16 in., 26.3c.; 1⅝ x 2⅝ in., 44c. All prices per ft., delivered New York Central tracks. Variation in prices of 3 in. due to slightly different specifications.

National Tube Co.—Seamless tubes, 2 in., 12.25c.; 2¼ in., 13.79c.; 3 in., 28.57c.; 5⅝ in., 43.87c.; 5½ in., 45.89c.; 4 in., 28.09c.; 3½ in., 22.1c.; 3 in., 22.97c.; 1¼ x 1 13/16 in., 36.35c.; 1⅝ x 2⅝ in., 60.84c. All prices per ft., with delivery at Youngstown. Variation in prices on 3 in. due to slightly different specifications.

Pittsburgh Seamless Steel Tube Co.—Seamless tubes, 2 in., 12.25c.; 2¼ in., 13.75c.; 3 in., 27.50c.; 5⅝ in., 43.75c.; 5½ in., 45.75c.; 4 in., 25.50c.; 3½ in., 22c.; 3 in., 20.75c.; 1¼ x 1 13/16 in., 25.50c.; 1⅝ x 2⅝ in., 44.75c. All prices per ft., delivery at Youngstown. Variation in prices on 3 in. due to slightly different specifications.

American Sheet & Tin Plate Co.—Black sheets, 3.10½c.; galvanized, 4.10½c.; blue annealed, 2.35½c., all per lb., base, delivery at Porter, Ind., or Youngstown.

Pittsburgh Steel Co.—Standard wire nails, $2.40 per 100 lb. keg, Pittsburgh.

Sheridan Steel Hoop Co.—Black sheets, 3c.; blue annealed, 2.25c., per lb., base, Youngstown.

Standard Forgings Co.—Axles, 1.95c. per lb. to 3.50c. per lb., according to specifications. Delivery at Indiana Harbor, Ind.

Dilworth, Porter & Co.—Track spikes, 2.10½c. to 2.25½c., no extras, delivery at Pittsburgh.

Superior Sheet Steel Co.—Black sheets, 3c.; galvanized, 4c., per lb., base, Pittsburgh.

Trumbull Steel Co.—Black sheets, 3.06½c.; galvanized, 4.06½c.; blue annealed, 2.31½c., all per lb., base, Youngstown.

United Alloy Steel Corporation.—Black sheets, 3c.; galvanized, 4c.; blue annealed, 2.25c.; Canton, Ohio, freight equalized with Pittsburgh.

Bethlehem Steel Co.—Bridge material, 5.71c. for structural steel, castings and rollers, delivered Lowville, N. Y.; 6.48c. for structural steel, castings and rollers, delivered Philadelphia; 4.51c. per lb., structural steel, delivered Bay View, N. Y., all per lb.; steel bars, 1.83½c.; shapes, 1.81½c.; plates, 1.81½c. for ¼ in. and heavier and 1.96½c. for under ¼ in.; track bolts, 3.41c. per lb. not heat treated and heat treated, 4.36c. per lb.; angle bars, 2.77c.; blank splice bars, 2.77c.; black sheets, 3.32c.; galvanized, 4.32c.; blue annealed, 2.57c.; axles, 3.35c. per lb.; billets, $37.32. All of

the above prices, except where otherwise indicated, are for delivery at Newberry Junction.

Lukens Steel Co.—Plates, 1.82c. per lb., base, delivered at Newberry Junction.

American Rolling Mill Co.—Billets, $32, base, Cleveland, carbon extra, $1 per gross ton; black sheets, 3.10½c.; galvanized, 4.10½c., and blue annealed, 2.35½c., per lb., base, Youngstown.

Lake Erie Bolt & Nut Co.—Track bolts, 3c. per lb. for non-heat treated; heat treated, 4c. Extras of 15c. and 30c. per 100 lb.

King Bridge Co.—Bridge material, 7½c. per lb. on structural steel, castings and rollers for delivery at Lowville, N. Y.; 9½ c. per lb. on structural steel, castings and rollers, for delivery at Philadelphia; 4.2c. per lb. on structural steel for delivery at Bay View, N. Y.

Standard Steel Works Co.—Tires, 5½c. to 8c. per lb., Pittsburgh, according to specifications: Extra of ¾c. per lb. if finished bored. Axles, 4.40c. per lb., Pittsburgh.

Seneca Iron & Steel Co.—Black sheets, 3c. per lb., Buffalo.

Mesta Machine Co.—Axles, 3.70c. per lb., rough turned, f.o.b. West Homestead, Pa.

Canton Sheet Steel Co.—Black sheets, 3.12½c.; galvanized, 4.12½c.; blue annealed 2.37½c., all per lb., base, Alliance, Ohio.

Cleveland Steel Co.—Blue annealed sheets, No. 10 gage, 2.02c., Nos. 11 and 12, 2.10c., per lb., Cleveland; steel plates, 1.60c. per lb., base, Cleveland.

Inland Steel Co.—Track bolts, oval neck, 3.25c., for non-heat treated, heat treated, 3.50c. per lb.; track spikes, 2.25c. to 2.35c. per lb.; angle bars, 2.40c. per lb.; black sheets, 3.38c.; galvanized, 4.38c.; blue annealed sheets, 2.63c.; bar, shapes and plates, 1.50c., all f.o.b. Indiana Harbor, Ind.

Brier Hill Steel Co.—Black sheets, 3c.; galvanized, 4c.; blue annealed, 2.25c., all per lb., base, f.o.b. Pittsburgh, plus freight to Youngstown.

Pollak Steel Co.—Axles, 1.98c. to 2.18c. per lb., delivered Chicago; 3.18½c. to 4.28½c. per lb., delivered at Toledo, Ohio.

Uses and Abuses of Molding Sands*

Typical American Sands and Their Composition—Sand for Various Metals—Discussion

SAND for foundry use is a subject about which very little information can be obtained from books or technical papers. This probably is due to the fact that each foundryman requires a material best suited to the class of castings he is to produce. Different methods of molding—floor molding, bench molding, hand rammed and air pressed machine molding—require different grades, as also do heavy and light castings, castings which require a fine finish and those in which finish is unimportant.

Steel, malleable iron, cast iron and brass, melted at different temperatures in the order named, require different refractory conditions in the sand. Gases generated in different lines require varying conditions of porosity. Both conditions are governed by the silica content of the sands selected. As the silica content is increased the sand is weakened. In castings where there are deep pockets or close corners to be lifted, a greater bond is required. This bond is controlled by the varying alumina or iron oxides. The predominance of either may be noted by the color, iron giving the red and alumina the yellowish shades.

Summing up the foregoing, there are but two conditions required: Bond and porosity, alumina and silica, or in simpler words, clay and sand; for example, lake sand, almost entirely silica, and clay for brick and tile purposes, mainly alumina, neither being suitable for molding. Other oxides appear to have no particular value for molding purposes, lime in particular being detrimental to the finish of the casting in some lines. The finish is controlled by the texture or grain of the sand. The fineness is determined by running the sand through a series of sieves ranging from 10 mesh to 100 mesh.

There does not appear to be any set place or condition of mining. Good molding sands exist in almost every State, freight rates being the determining factor as to price in most foundries. It is sometimes taken from the hill tops, again from the prairies and sometimes in very deep banks in the hills with gravel pits below. From some of our Illinois farms it occurs in layers from 1 to 3 ft. deep. After the topsoil is removed, the No. 1 grade or finer sand comes from the top layer, usually 12 to 20 in. deep, the No. 2 grade below, being a little coarser, with the No. 3, still coarser next, followed by a clay soil.

In parts of Wisconsin different grades of sand (varying in texture) appear at the surface 100 to 500 ft. apart, and not in layers as above explained. It appears in some cases that certain grades of sand are the results of glacial deposits. It has always appeared to me that our fine sands in the West could be traced by drawing a line from the lower central part of Wisconsin southeast, curving through central Illinois, central Indiana and northern Kentucky to the Virginias. In the hills of Kentucky turning over the sod sometimes shows the finest of molding sands. Along the line mentioned can be found sands equivalent to the French prepared sands or the equal, if not the superior, of the Albany sands which are so well known throughout the country. The fame of the Albany sands dates from the time when our original foundries were located in the East. At that time, as now, water transportation was much in the public mind. Then, however, they did not have railroads at all; so the molding sands were sent down the Hudson and along the coast.

It is noticeable that all Eastern sands are high in silica and very open and can be rammed very hard without harm to the casting, whereas the same treatment of our Western sands would result in loss. But their sands will not retain the bond as long as ours. Freight rates prevent a greatly desired interchange of sands between the East and the West, each having that which the other needs for blending purposes. Blended or milled sands are furnished by some dealers and samples shown are always attractive because of their uniform texture, but there is nothing to show that they are suitable for the class of castings to be produced, and in some cases the blending only serves to cover up features which would otherwise be objectionable.

No foundryman should confine himself to one grade of sand. At least two grades should be carried, one high in bond or alumina, the other high in silica for use in opening up sands when losses occur from blow, etc., and for facing purposes on heavier lines of work. The high alumina sands are to be added to the molding sand as a binder when it has been weakened by constant use or from other causes.

A good molding sand is often condemned on account of abusive practices by the foundryman. The excessive addition of new sand will invariably cause loss, both of castings and sand. Where sand is too strong or new it burns on the casting, causing waste. Excessive use of sea coal facing very often weakens the sand, the unburned portion in the molds after a short time destroying the bond by coating each grain with carbon. The sand becomes a deep black, whereas the natural color of burned sand is red. This condition can only be overcome by addition of a bonded sand.

Another weak condition comes from constant use of a sand for heavy castings, the bond being carried away with the casting and renewal being necessary. When an excess of core sand drops from the castings into the heap, increasing the silica, the sand is weakened and an increased bond is needed. As said before, silica is a weakener of sand, but is very necessary in the mold to create porosity to carry away the gases.

*Paper read before Chicago Foundrymen's Club, March 11. The author, Eugene W. Smith, is with the Crane Co., Chicago.

When castings are taken out of the sand and the sand is not sufficiently well knocked off the very best portion of the riddled sand is carried away and wasted. A common practice of pouring surplus metal into sand heaps causes a waste both of sand and of labor handling the metal. It is far better to furnish ingot molds for this purpose. Still another common practice of burning out, thawing or drying out new sand by pouring metal into it is extremely wasteful both of metal and sand.

A Few American Molding Sands

	Opener	Binders		Of No Particular Molding Value				Texture and Finish	
	SiO_2, Per Cent	Fe_2O_3, Per Cent	Al_2O_3, Per Cent	CaO, Per Cent	MgO, Per Cent	Alkalies, Per Cent	SO_3, Per Cent	Fineness	
Tennessee	92.96	3.10	4.92	...	...	0.26	...	98.58	Fine Weak Open
Long Island, N. Y.	89.16	2.92	4.66	...	0.33	0.33	...	0.53	Coarse Weak Open
New York	82.34	4.24	8.50	0.96	0.40	1.79	0.54	1.70	Coarse Strong Open
Indiana	82.50	2.70	8.90	0.16	0.61	1.47	...	0.59	Coarse Strong Open
Wisconsin	82.87	2.67	8.45	0.80	0.89	1.00	Trace	57.3	Medium Strong Open
Indiana	79.66	9.74	3.36	1.34	0.68	2.50	...	78.34	Medium Strong Open
South Carolina	79.30	4.10	10.70	1.19	1.29	...	...	...	Strong Open Open
Kentucky	76.16	4.24	12.02	...	0.72	1.21	...	...	Fine Strong Strong
Ohio	77.14	6.44	9.20	Trace	0.91	1.10	...	...	Open Coarse
Illinois	75.70	13.46	3.00	0.60	1.08	2.15	0.19	0.60	Strong Close Fine
Illinois	56.80	5.09	14.43	6.40	5.60	3.15	0.14	70.24	Strong Very close

Sometimes a sand is highly recommended by one foundryman to another as having given him wonderful results. Its appearance being favorable, a supply is ordered without considering that his own work is heavier, the result being that the sand is soon burned out and weakened, with a consequent loss of product. Thus it is very apparent that one standard will not suit all lines of work.

Herewith I give a few sands taken at random from different States, showing variations in the elements and composite fineness of most of them. I intentionally omit names and brands of sands. A study of the table should show the variation met with in all molding sands. It would be a very desirable feature if all sands sold could be accompanied by a standard analysis. This should particularly apply to blended or milled sands where the texture has been changed and sometimes an otherwise unsuitable sand is made to appear satisfactory.

The present practice of selling and purchasing molding sands appears very crude. Small spoonful samples are shown by the salesman and are supposed to represent the contents of carloads to be shipped. The purchaser squeezes it into a ball to test the bond and finish by "feel," and sometimes puts it to his ear and rubs it to test its openneess by "sound." All that is left for him to do is to taste it. If the Bureau of Standards, universities and technical men can devise some form of table, such as is presented here in an incomplete shape, it would prove a great help both to the producer and consumer.

Discussion

Among those who participated in the discussion were R. A. Bull, research director the Electric Steel Founders' Research Group, Chicago, and chairman the Joint Molding Sand Research Committee of the American Foundrymen's Association and the National Research Council; C. S. McNeal of the Garden City Sand Co., Chicago, and H. S. Vrooman. Mr. Bull outlined the broad scope of the work undertaken by his committee and told of the progress which had been made up to date. The committee comprises 37 members and has had one meeting thus far, while various subcommittees have met several times. The first step in the investigation, the preparation of a bibliography, has been completed. This was done by the secretary of the committee, R. E. Kennedy, who is also assistant secretary the American Foundrymen's Association. He not only listed all articles which have been written on the subject of sand and sand tests, but has abstracted all information which might be of use to the committee.

The importance of the work undertaken by the committee is indicated by the fact that $7,500,000 was spent in 1920 for molding sand alone. Mr. Bull stated that the problem confronting the investigators was particularly difficult because no standards have been established by which to gage the quality and suitability of various sands for different purposes and no satisfactory tests have been devised for ascertaining such standards. The next step in the work, he said, would be on the subject of tests. The committee has found, for instance, that even tests for fineness are not uniform. Sieves may have the same number of meshes per square inch, but owing to the fact that there is a difference in the diameter of the wires, the results from different tests are not conclusive. The personal equation in sifting also prevents accuracy in fineness testing.

It is difficult also to determine the percentage of moisture in sand, and even when it is determined it does not always have the same significance. It has been found, for instance, that it is better to store high bond sand in a moist atmosphere than to permit it to dry out and then to restore the moisture subsequently. The reason for this is not yet clear.

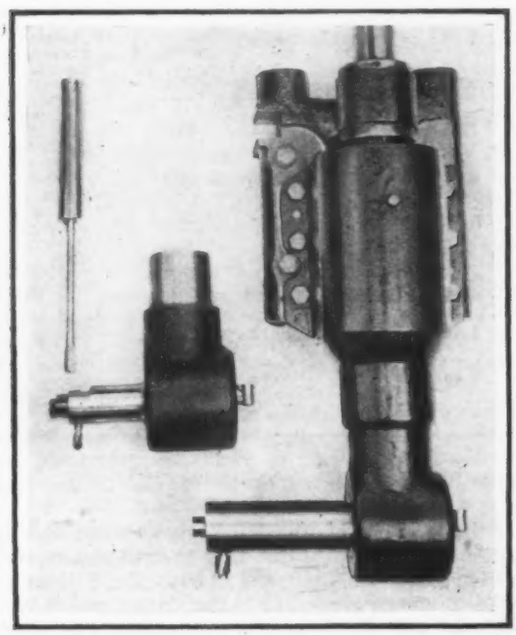
A satisfactory test for bond is also lacking. One method is to push a bar of sand over the edge of a table and measure the length of the portion which drops off. Others take the weight of the portion which drops, but in either case much depends upon the surface of the table top, the speed at which the bar is moved and the friction between the bar and the table.

These are just a few of the problems confronting the committee. Mr. Bull stated that one important result of the investigation would be to make available to the foundry industry many sand deposits which have not yet been exploited. A number of important sources of supply, he stated, would soon be exhausted, and heretofore there has not been much investigation of new deposits. When suitable standards have been devised, however, State geologists will be able to locate new deposits suitable for molding use. The meeting was unusually well attended.

Heavy Duty Offset Drilling Attachment

What is called a maximum duty, minimum space offset drilling attachment for drilling, milling, countersinking and counterboring port holes and grooves in air tools, such as rock drills, pneumatic hammers, drills and riveters, has been placed on the market by the H. E. Harris Engineering Co., Bridgeport. It is made to fit any standard drill press.

The attachments are made to reach into the main bore and drill or mill the vents or ports from the inside and their use permits drilling to a specified depth, counterboring or milling circular, transverse or longitudinal slots. Because of the small space in which the tools must work and the comparatively long overhang, there are no clearances, the offset or horizontal arm being made as large as the bore of the air chamber and the depth of the drilling or milling will permit.



At Right, the Offset Drilling Attachment Is Shown on Special Bracket. Driving spindle appears at extreme left

Both the entire patented transmission and the offset arm are made from tool steel and are accurately ground and lapped after heat treatment.

There is no lost space inside the arm itself, all inside clearances being kept to a very small margin, which is possible by grinding and lapping. This is intended to retain all the metal that can add to the strength of the arm and contributes to the extreme rigidity of section required.

The special shank drills, mills and counterbores are ground and lapped to fit the special spindle in the outer end of the arm and run true. These are readily changed and have a limited adjustment for depth to allow for grinding and setting.

At the extreme right in the illustration one of the heavy-duty attachments is shown mounted in a special bracket on the vertical slide of a Becker vertical milling machine. To the left of this is shown another offset attachment with a smaller arm which is for use on smaller work. This is interchangeable in the special bracket with the arm shown in the bracket. The driving spindle is also shown. This has a taper shank fitted to the machine spindle and at the lower end it is squared to drive the offset attachment. It will be noted that this is necked down in diameter between the squared end and the taper shank. This is intended to give increased elasticity and also provide a point of failure to prevent jamming of drills, mills or fixtures due to accident. The lower end is of cold rolled steel and is sweated into the taper shank with half and half solder; it is easily and inexpensively replaced.

The attachments may be used also for other purposes requiring inside drilling or milling, such as oil grooves, straight or spiral holes for holding babbitt in bearing boxes, end milling blind keyways to retain a feather or key in a hub sliding on a shaft, and other uses.

Coke Production Increased

Uniontown, Pa., March 25.—Seven hundred and fifty ovens are being added to-day and Monday (March 27) to the active list by the H. C. Frick Coke Co. This will bring the total of ovens fired during the past week to more than 1200 and will bring the coke production of the Frick company up to approximately 44 per cent. Included in the list of plants affected by increased coke production are the two Heclas and the Oliphant plant and the Whitney plant of the Hostetter-Connellsville Co., which has been idle for six months to a year.

Coke business in the region is firm and is showing a steady increase. Prices are firm at $3.25 and $3.50 for furnace grades and 75c. to $1 higher for foundry grades, although little foundry coke is being shipped. Independent coke production also is showing a substantial increase.

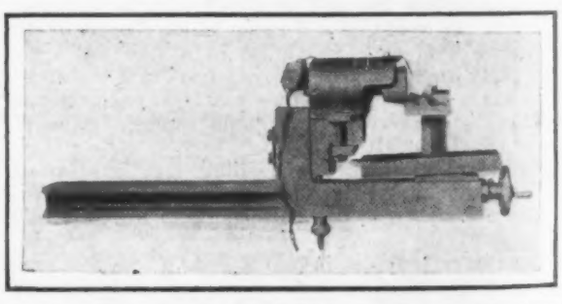
The increase in coke business, observers believe, is little affected by any threatened strike of miners in the union fields. Furnace production throughout the country is showing steady increase and this is being reflected in the Connellsville field.

Coal production during the past week has shown a substantial increase although the prices have softened. There is every indication here that the strike in the union fields will be a protracted one, but operators see no sensational price flurries on coal until reserve stocks accumulated by consumers during the past several weeks near exhaustion. Best grade Pittsburgh coal is quoted at around $1.50, mines.

Cutter Grinder for Re-Turning Tool

The crankpin re-turning tool made by the Sawyer-Weber Tool Mfg. Co., Los Angeles, previously described, is now equipped with an electric cutter grinding attachment, as shown. It is intended to permit rapid sharpening of the tool bit and can be attached conveniently without altering the re-turning tool. The cutter is ground in from 2 to 5 min.

A ½ hp., 10,000 r.p.m. motor is used. The end thrust of the motor shaft is adjusted by the same collet which holds the wheel. The cutter to be ground is passed in the groove of the guide blade with the fingers, micrometer adjustments being made by the hand wheel



Crankpin Re-Turning Tool with Cutter Grinding Attachment

and dial of the re-turning tool. Simplicity of adjustment is emphasized as a feature.

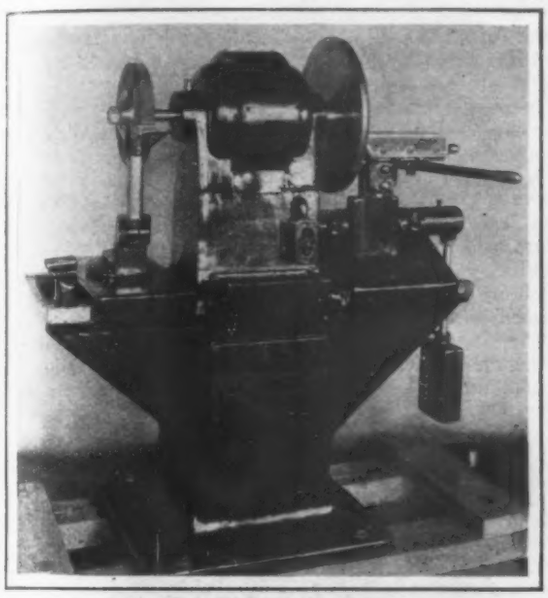
The tool itself when in operation rides around with the crank-pin, the handle resting on the bed of the lathe. The cutting tool is fed into the pin by means of the handwheel at the end of the re-turning tool shown in the illustration. The wheel has a dial below it that is graduated in thousandths of an inch. The dial is locked in any position by a set screw, which is intended to facilitate turning the pins to exactly the same size. The cutter is clamped securely in a V-slot and is parallel to the back plate at all times, thus generating a true circle. Graduations on the V-blade are used in setting the block for different diameter pins.

New Badger Grinder

The accompanying illustration shows the new No. 2 grinder added to the line of the Badger Tool Co., Beloit, Wis.

Various forms of equipment are applicable to this machine, the illustration showing the right end equipped with 16-in. disk wheel, faced with the company's new Diacarbo abrasive disk, which is ⅝ in. thick. This disk is served with the universal lever feed table, as shown. The left end of spindle is extended to receive 12-in. solid grinding wheel, which is served with adjustable work rest.

A General Electric Co. 3-hp. motor is used and fitted with special end frames and SKF ball bearings, both radial and thrust. The motor is fully inclosed



The Universal-Lever Feed Table Serves Disk, as Shown

with forced ventilation passing down through the machine pedestal. A push button station and automatic starter are provided. The weight complete is 1300 lb.

German Machine Tool Exports

WASHINGTON, March 28.—An analysis by the industrial machinery division of the Department of Commerce, based on the latest figures received from Germany, indicates that there has been a considerable decrease in the volume of Germany's machine-tool exports during 1921, as compared with 1920 and the prewar year 1913.

Exports for the seven months, May to November, 1921, were 39,046 metric tons. Exports for the full twelve months of 1920 were 94,921 metric tons. Taking the total of 39,046 metric tons for the seven months of 1921 and employing the same ratio for the missing months, 1921 would give a total of approximately 67,000 metric tons, a falling off in volume of 27,921 tons and 23,279, as compared with 1913.

Not Afraid of Coal Shortage

YOUNGSTOWN, March 28.—Little or no concern is voiced by leading steel interests over a possible coal shortage in event the threatened coal miners' strike materializes, unless it should be prolonged beyond all expectations.

Both large and small industrial plants have sufficient reserves on hand to meet their requirements for several weeks, even though union mines were to completely suspend. One large independent in the Mahoning Valley, for instance, has piled over 100,000 tons of coal, while other plants are fortified equally as well. So large are their accumulations that some interests are now buying only in a moderate way, and prices of both coal and coke are characterized as soft, on account of this condition. Trunk line railroads have large fuel supplies, as well as public utilities and waterworks plants, insuring uninterrupted operations.

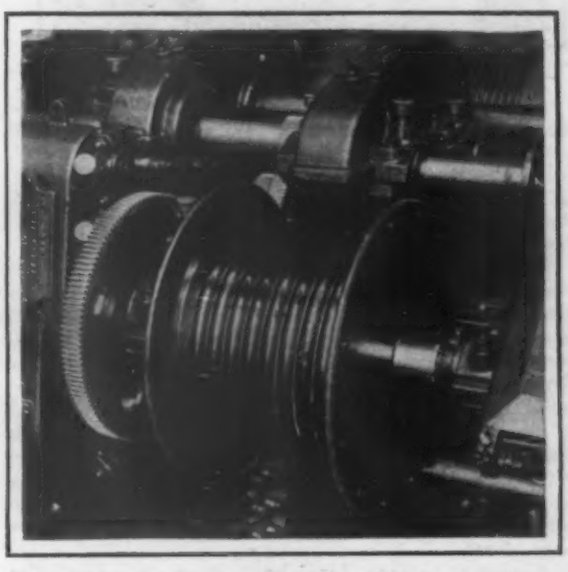
Improves Crane Magnet Cable Drum

The Pawling & Harnischfeger Co., Milwaukee, has developed a new feeder cable retriever intended as an improvement over ordinary types of cable take-up drums which have positive-geared or chain-sprocket drives for both hoisting and lowering directions.

The new design, shown in the illustration as applied to a 5-ton crane, has been developed on the principle of keeping the cable taut at all times. A fixed but moderate tension in the feeder cable is maintained, the cable winding up and paying out without slack or undue strains. The cable drum is driven only in the hoisting direction. The drive consists of gearing from one of the shafts of the hoisting mechanism, the final drive to the drum being by friction. The gearing is proportioned to drive the drum at a peripheral speed greater than the speed at which the magnet is being hoisted. This arrangement is intended to cause the friction drive to slip, producing moderate tension in the magnet cable which may be adjusted by tightening the thrust spring of the friction drive.

The cable drum is not driven in the lowering direction, a pawl and ratchet wheel attached to the driving friction preventing it from revolving. The cable is then unwound, due to the pull of the cable while the magnet is lowered. Raveling or too rapid unwinding is said to be prevented by the resistance of the stationary friction against the cable drum which produces the same tension or pull on the cable in the lowering direction as in the hoisting.

Large flanges are provided on both sides of the drum and all bearings are bronze bushed. Collector rings and brushes are of the same construction as slip rings of the alternating current motor, the brushes being of the carbon type with a constant pressure on



The Drum Is Driven Only in the Hoisting Direction

the rings. The collector is enclosed in a housing and mounted at the end of the shaft, a hinged cover providing access to the parts.

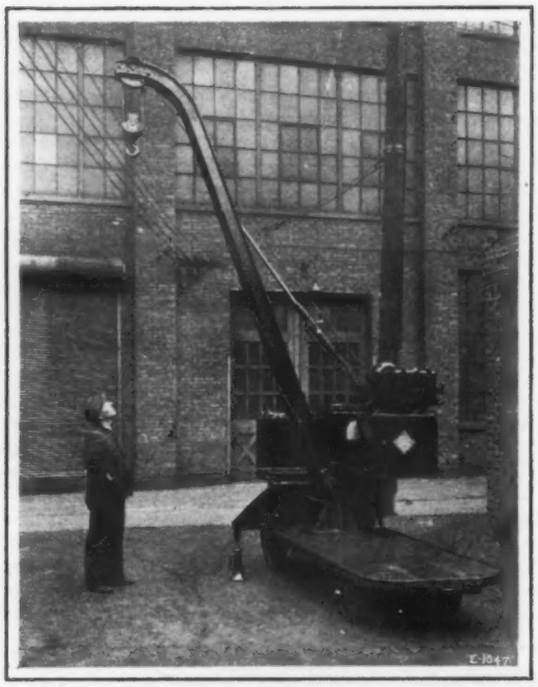
The magnet cable leads are securely attached and no electrical contacts left exposed.

More than 1,000,000 tons of sheets have been rolled on the sheet mills of the Youngstown Sheet & Tube Co., Youngstown, Ohio, since the plant was originally operated 20 years ago, in April, 1902. A fair average of the product has been sheets of No. 24½ gage. The original plant consisted of six mills which rolled chiefly puddled iron sheets. The first of these were used for roofing buildings in the new plant and some are still in good condition. There are now 15 units.

Portable Crane for Heavy Lifting

The crane truck shown in the accompanying illustration, a development of the Elwell-Parker Electric Co., Cleveland, is similar in design to machines of that company previously described.

It is intended for heavy-duty use in stacking materials in yards and warehouses and in the assembly of heavy or bulky units in machine shops. The machine is essentially an electric truck having a carrying capacity of 3000 lb. with a revolving counter-balanced crane mounted on it. The crane will handle loads up to 3000 lb., picking up 1000 lb. at 8 ft. outreach at the



With Outriggers in Position, as Shown, the Crane Will Lift 3000 Lb. at 6 Ft. Reach

side or end of the platform. With the outriggers in position, as shown, the crane will lift 3000 lb. at 6 ft. outreach. The boom may be lowered to permit entering doorways. The outriggers are quickly adjusted and when not in use are folded and swung in beside the crane column.

In this design a heavy vertical steel column having a long bearing in the steel pedestal which is bolted in turn to the steel platform of the truck, supports a 12-ft. boom. The boom may be racked in or out by the operator without leaving the driving position. The hoist is operated by a separate motor direct connected to an inclosed hoist mechanism, the controller being located on the dash in front of the operator. The hoist is mounted on a steel frame which houses the battery, the battery, hoist and motor being arranged to act as counterbalance. A special trip switch mounted on the front of the battery box stops the inward motion of the boom as set.

A single battery furnishes power to propel the truck, as well as operate the crane. Large wheels permit using the truck in yards and all four wheels steer. A coupler is provided on the rear to permit use of the unit for intermittent tractor service. Motors, differential worms, wheels and crane pillar column are fitted with ball bearings.

Further Improvement in Business

In a preliminary summary of March business conditions, the Department of Commerce finds that "business is gradually working its way back toward normal. This movement is not always evenly distributed among the different industries, but, having regard to those fundamental industries which constitute the backbone of American business, there is a marked improvement over the conditions recorded a few months ago."

The most fundamental change in recent weeks is the improvement in agricultural products. There is an increase of 20 per cent in cotton consumption, compared with a year ago, in spite of present widespread labor troubles in New England. Both pig iron and steel ingot production show recent increases. Coal production has continued to increase. Building contracts are showing substantial gains. Transportation and unemployment conditions have improved. All of these factors have been reflected in a slight increase in wholesale price index numbers, and in an upward movement in the stock market.

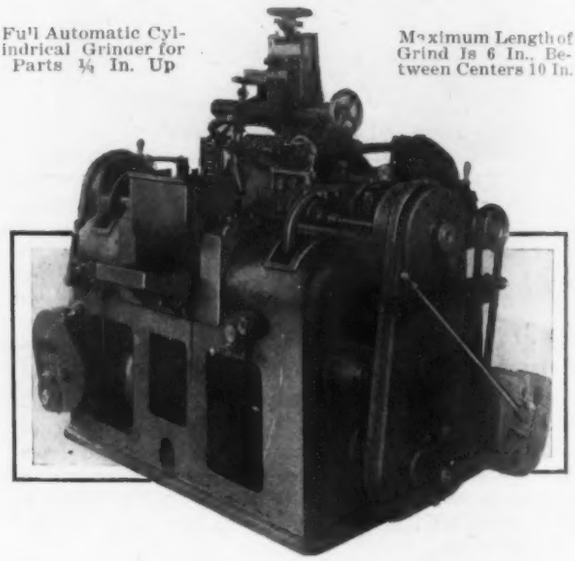
New Full Automatic Cylindrical Grinder

A recent new offering in machinery for cylindrically grinding machine parts on centers is represented in the full automatic machine shown in the accompanying illustration, a development of the Warren F. Fraser Co., Westboro, Mass.

Increase of production from 200 to 400 per cent over the usual grinder is claimed for this machine, the output of piston pins of average size, ⅞ in. in diameter by ¾ in. long, at the rate of 5 per min. being given as an example. It is intended for grinding shafts, shackle bolts, king bolts, valve tappets, telephone receivers, fountain-pen barrels and caps and a diversity of other machine parts from ½ in. diameter upward. The maximum length of grind is 6 in., the maximum length between centers being 10 in.

The wheel head is heavily constructed and the spindle designed to carry a grinding wheel 18 in. in diameter and up to 6 in. face. Bearings are lubricated by

Full Automatic Cylindrical Grinder for Parts ¼ In. Up — Maximum Length of Grind Is 6 In., Between Centers 10 In.



forced feed. The machine is self contained and driven by a 15 hp. motor with 4½ in. belt. It may also be arranged for drive from overhead shaft. The weight is 7000 lb.

A smaller machine weighing 4000 lb. which will be ready for the market soon, will be for work ⅛ to 1½ in. in diameter, up to 2 in. in length of grind and 8 in. between centers.

The Hendee Mfg. Co., Springfield, Mass., motorcycles, will increase its output to 1400 machines, contrasted with 600 each this and last month. Incoming orders warrant the increased production.

The General Electric Co., Schenectady, has received an order for $1,000,000 of electrical equipment from the Southern California Co., Los Angeles. Half of this business will be filled by the company's Greenfield, Mass., plant in the form of transformers.

"Non-Metallic Impurities in Steel" was the subject of an address by F. W. Miller, Rochester Welding Works, Rochester, N. Y., before the monthly meeting of the Rochester Chapter of the American Society for Steel Treating, March 23.

Bench Type Pattern Shop Speed Lathe

A new 12-in. alternating current motor headstock lathe for use in pattern shops and vocational schools has been placed on the market by the J. G. Blount Co., Everett, Mass. The lathe is regularly for use on a combination bench although long legs are provided if desired.

The headstock is of ½ hp. capacity, fully inclosed and equipped with SKF ball bearings. The spindle is

Motor Headstock Lathe. The cabinet shown is not part of regular equipment

of 45 point carbon steel with a hole ⅝ in. in diameter bored the entire length and provided with a Morse No. 2 large taper. The spindle nose is 1⅛ in. outside diameter, 10V-threads per in., the rear end of the spindle having the same diameter, with left hand thread. An outside face plate and pulley combined, 8 in. in diameter, can be used for belting to auxiliary equipment. The bed has a flat top and is cross braced. The lengths supplied are 4, 5 and 6 ft., the maximum distance between centers being 25, 37 and 49 in. respectively.

The controller has four running positions for spindle speeds of 575, 1160, 1750 and 3450 r.p.m. It is placed within the headstock end, a set of bevel gears connecting the controller with the handle shown in the accompanying illustration. A safety switch, used in connection with the controller, is located on the end of the bench and easily thrown on or off by the foot.

The tailstock has a broad flat base 6¼ by 7½ in. The bearing for the spindle is 8 in. long and the rear handwheel 8 in. in diameter. A Morse No. 2 large taper is used for the center. The rest holder is large and clamps by means of a binding handle threaded to a stud; is quick and positive and extends from side of the rest. For clamping the rests a binding screw is located conveniently on the right side of the rest holder.

The machines are regularly equipped with one spur and cup center, 3 tee rests, 5½ in. face plate with holes for wood screws, a 3-in. screw chuck, a 2½ by 4 in. right angle rest, a knockout rod for center and a wrench. Other equipment shown in the illustration is extra.

The Sioux Falls Corrugating Co., sheet metal products, has awarded a contract to the Carlson & Snitkey Construction Co., Sioux Falls, S. D., for a one-story factory building 145 x 150 ft. of brick and steel, work to start at once.

Six Months' Reduction in Steel Prices

In response to the request of a correspondent, the following table showing the prices of the articles named, in mid-September of 1921 and mid-March of 1922, has been prepared. It will be noted from the last column that the largest percentage of reduction has occurred in bars, beams and plates; these have since advanced. Following these, wire nails and open-hearth rails show large reductions. Tin plate, Bessemer rails, pig iron and billets follow in the order named.

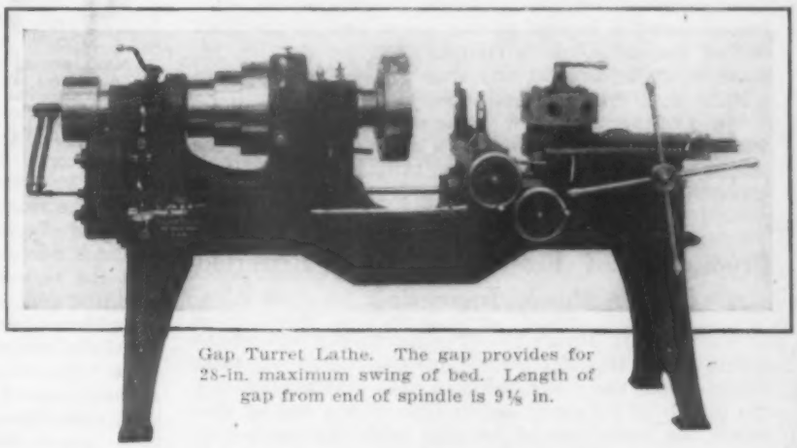
	Sept. 13, 1921	March 13, 1922	Percentage of Decrease
Pig Iron (Composite)	$19.81	$18.25	7.9
Billets	29.00	28.00	3.5
Open-Hearth Rails	47.00	40.00	14.9
Bessemer Rails	45.00	40.00	11.1
Bars	1.65c.	1.35c.	18.2
Beams	1.65c.	1.35c.	18.2
Plates	1.65c.	1.35c.	18.2
Wire Nails	$2.90	$2.40	17.2
Tin Plate	5.25	4.60	12.4

Work of Engineering Standards Committee

The activities of the American Engineering Standards Committee have developed to such an extent that work is now underway on 79 distinct projects, such as industrial lighting, structural steel shapes specifications for fire tests, a safety code for abrasive wheels, ball bearings, a safety code for compressed air machinery, a safety code for foundries, gears, a safety code for machine tools, a safety code for power presses and specifications covering non-ferrous and ferrous metals. In its work, 160 bodies of national importance are cooperating, these having designated more than 500 individuals as official representatives to serve on sectional committees working under the auspices of the committee. An account of the work of the committee is given in a 32-page pamphlet published by the committee at 29 West Thirty-ninth Street, New York, Dr. P. G. Agnew, secretary.

Gap Turret Lathe

A departure from the standard design of turret machinery is represented in a new gap turret lathe



Gap Turret Lathe. The gap provides for 28-in. maximum swing of bed. Length of gap from end of spindle is 9⅛ in.

brought out by the Acme Machine Tool Co., Cincinnati.

The dimensions of the machine are in general the same as those of the 20-in. Cincinnati Acme turret lathe, except that the gap provides for 28-in. maximum swing of bed. The length of gap from the end of the spindle is 9⅛ in. The machine has been equipped with an air chuck and also power feed to cross travel, to cut-off rest, and power feed to longitudinal travel of the turret; but any combination can be provided.

In this machine the minimum distance from end of the spindle to the turret face is 14¾ in. and minimum from end of the spindle to the inside edge of the cross slide, 8⅛ in. The feeds to the cross slide are 40, 70 and 120; those to the turret 24, 43, 73 and 123. The cross movement of the cross slide is 7 in. and the lateral movement 4 in. The maximum distance from the inside of cross slide to end of the spindle is 12 in.

Portable Engine Lathe

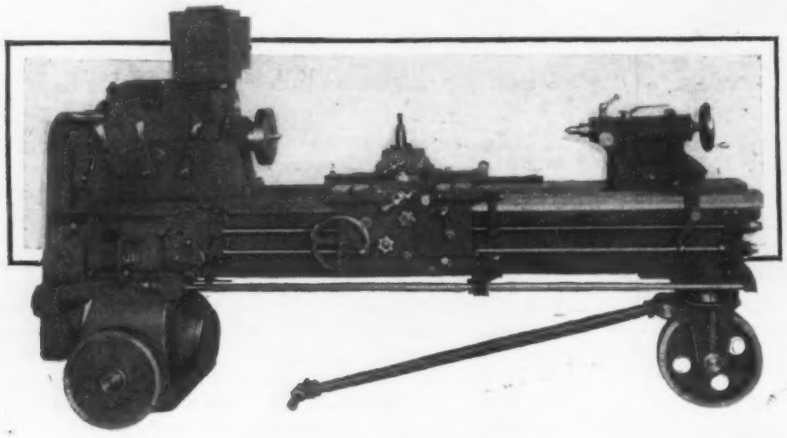
The Lehmann Machine Co., St. Louis, is offering a portable type of its geared-head engine lathe, intended particularly for railroad and other shops doing large work where it is frequently necessary to bring the tool to the job.

The lathe is shown in the accompanying illustration. It is built in two sizes, 16-18¼ in. and 18-20¼ in. swing. Direct motor drive through belt and idler is employed, the motor running at 1800 r.p.m. It is mounted in the cabinet leg at the head end, as shown, the pulley, belts and other parts being adequately safeguarded.

The headstock gives 16 spindle speeds in almost geometrical progression, with the use of 10 gears. The headstock forms an oiltight casing enclosing all running parts. Shafts in the headstock run on ball bearings with the exception of the spindle, which is of alloy steel, hardened, and runs in phosphor-bronze bearings amply lubricated. The spindle nose has two diameters, both hardened and ground. These give two bearings for face and chuck plate, one in front and one behind the threads on the spindle nose.

Forward and reverse to the spindle is obtained through patent friction clutches, running in oil, with control handles located at the apron and at the head end of the lathe. It is claimed that the clutches require no adjustment at any time and will always pull a little more than the load imposed.

In addition, the new portable lathe includes the other features of the company's machines, such as the patent quick-change mechanism, tailstock spindle locking device, rod and screw shift and others.



Portable Geared-Head Engine Lathe for Shops Doing Large Work and Where Bringing the Tool to the Job Is an Advantage. The motor is mounted in the cabinet leg at the head end, as shown

Production of Fire Clay Brick Reported Slowly Increasing

PITTSBURGH, March 27.—The monthly report of the Refractories Manufacturers' Association, based upon reports from the membership of that organization, for the month of February shows that at the end of that month the production of fire clay brick had reached 44 per cent of monthly economical producing capacity, as against 38 per cent at the end of January; shipments during the month were 38 per cent, as compared with 40 per cent in January and the stock on hand at the end of February was equal to 187 per cent of capacity, against 176 per cent one month before. New orders for February were equal to 46 per cent of capacity, against 41 per cent in January, while unfilled orders at the end of February were 39 per cent of capacity against 30 per cent a month previously. In 1921, 100 per cent of economical monthly producing capacity was stated as 27,305,500 9-in. equivalents.

The report shows that production of silica brick for February was 24 per cent of monthly economical producing capacity, the same rate as in January. Shipments were 27 per cent of capacity, against 30 per cent in January; stocks 131 per cent, as compared with 133 per cent; new orders 30 per cent, against 35 per cent in the previous month and unfilled orders 41 per cent of capacity, compared with 37 per cent in January. In 1921, 100 per cent equalled 78,645,942 9-in. equivalents.

Marketwise, refractories do not show much change. Improvement in the steel business is fairly closely reflected in the demand for the various kinds of refractories, but the complaint still is heard that the makers of iron and steel are inclined to keep their purchases down pretty close to actual requirements and there are apparently as many deviations from quoted prices now as there were recently. Quotations of $28 per 1000 for Pennsylvania silica brick have not entirely ceased and on high duty Pennsylvania fire clay brick there are still some makers who are willing to take business at $30 per 1000. These prices are $2 per 1000 below what most makers are trying to get. Most of the recent business is magnesite brick has been at $53, Baltimore, but there are reports that less than that has been done. Similarly, although $40 per net ton is supposed to be minimum on chrome brick, business has been lost at that price.

We quote per 1000 f.o.b. works:		
Fire Clay	High Duty	Moderate Duty
Pennsylvania	$32.00 to $35.00	$30.00 to $32.00
Ohio	30.00 to 35.00	28.00 to 30.00
Kentucky	32.00 to 35.00	30.00 to 32.00
Illinois	32.00 to 35.00	30.00 to 32.00
Missouri	32.00 to 35.00	28.00 to 32.00
Silica Brick		
Pennsylvania		30.00
Chicago		35.00 to 37.00
Birmingham		40.00
Magnesite Brick		
Standard size per net ton (f.o.b. Baltimore)		53.00
Grain magnesite per net ton (f.o.b. Baltimore)		28.00
Chrome Brick		
Standard size, per net ton		40.00 to 42.00

The secretary of the engineering section of the Society for Technical Aid to Soviet Russia, 110 West Fortieth Street, New York, sends out a letter saying that the section has been appealed to by the Russian scientific and engineering societies for books, bulletins, pamphlets and current literature on the scientific and industrial progress in the United States, particularly since 1914. Individual members have donated toward a fund created by the engineering group in order to send such literature to Russia. The demand, however, is so great that the New York organization cannot meet it and an appeal is made to others to supply the literature wanted, the Russian societies promising to reciprocate with copies of their new publications.

To try out the Roberts type ovens on high volatile Pennsylvania coal, the Granite City plant of the St. Louis Coke & Chemical Co., operated on 100 per cent of that fuel for one week ending March 25. The results of the experiment were gratifying. The average coking time was 12 hr. for 30 tons of coal per oven per day. This is believed to be the largest tonnage of this kind of coal put through a coke oven in a day. The record of one of the larger Eastern coking plants using the same coal is 17 hr. for 19 tons per oven per day. The Eastern high volatile coal contains about 2 per cent less volatile than Illinois coal while its moisture content averages 3 per cent as against 8 to 8½ per cent for Illinois coal.

Increased Efficiency in Many Steel Plants

Fewer Workers Necessary Than During the War—Exclusive Surveys in the Mahoning Valley—Operating Organizations Improved

YOUNGSTOWN, OHIO., March 28.—Since the war there has been an appreciable increase in efficiency of workmen in iron and steel plants, say Valley operating managers. As a consequence, as units approach normal operations, employers find that the number of workers necessary to carry on production, is substantially less than during the war. Improved mechanical appliances are constantly being installed in steel plants, likewise, thereby reducing manual labor, quickening operations and enlarging production.

More efficient methods adopted by the mills are also responsible for this situation, which in the aggregate, is proving a substantial factor in cutting costs to the minimum. Exhaustive surveys have been conducted by Valley steel industries in an effort to promote efficiency, eliminate waste and reduce production costs. As a result of these efforts men have been eliminated wherever possible, without impairing efficiency.

At first, foremen, superintendents and production managers were inclined to complain and to resent the action. But workmen in the mills responded to changed conditions with alacrity, especially as operations grew slack and they realized it was a matter of the survival of the fittest. In some instances, results were achieved in this respect which exceeded expectations of executives.

Keen Competition for Jobs

Individual efficiency and production likewise advanced as competition for even ordinary jobs in the mills became keener. The careless, inefficient, lazy workers were simply eliminated. Operating organizations were combed and combed again under the pressure of reducing costs to meet keen competitive conditions in the steel market.

In consequence of this process of elimination, operating organizations of plants in this territory are at a high rate of efficiency. Managers are likewise alert for new mechanical developments which may aid in reducing costs. One large plant each month awards prizes to its workmen for suggestions to promote economy and reduce waste, and many valuable ideas have been evolved in this manner. For instance, last month a prize was given the suggestion of an oil sprayer which an employee constructed on an automatic thread milling machine. Another suggestion which was similarly rewarded was that steel bushings be installed in the spindles on concrete fence machines.

A Valley independent has been conducting intensive experiments with an advanced type of open-hearth furnace, and reports favorable results have been achieved in reducing the time required per heat and in other respects.

Metallurgists have been engaged experimenting to produce a better type of refractory, which will last longer and exhibit greater resistant qualities to intense heat applications.

Shipments of fuel and steel by water have received attention of the industry in its efforts to lower costs. A suggestion now receiving consideration is that barges which haul products down the Ohio River and return empty be employed to haul fluorspar from the mines in Kentucky on the return trip. Such a plan would effect a saving in transportation charges of several dollars a ton, states the traffic manager of a steel plant. Fluorspar destined for open-hearth steel plants in the Pittsburgh and Youngstown districts could be shipped to advantage in this manner, it is contended.

Economy of Cleanliness

The economy of cleanliness constituted the subject matter of a recent statement to employees of a large machine-building interest with plants at Pittsburgh, Youngstown and Canton, by a department head. "During the war work was pushed ahead at such a rapid rate of speed that each department was strained to the limit," says this operating official. "During this time, workmen, superintendents, owners—in fact, all—cared little about expense as long as it was not exorbitant. 'Produce' was the cry of the hour. Strictness gave way to swiftness, economy gave way to extravagance, bank accounts were big and buying was bulgy. What happened during these 'soft' times? Some of our departments became so busy that wherever a 'bottle neck' occurred we squeezed and squeezed through it, as long as we possibly could without widening it.

"This 'bottle neck' can be taken to mean a great many things. Let us start with the outside yards where our bulky raw materials are handled. These materials came upon us with such haste that within a short time our yards were in such a condition that one thing was piled upon another in no neat manner.

"We did the best we could, to be sure, but the burden was too heavy to be neatly handled. With production setting a new world's speed record, our foundries became huge sand piles at times and our finishing departments looked like the dumping grounds for the entire production, especially when cars were difficult to obtain for shipment. Workmen dropped their tools with the whistle, in order to have them on the job the next day. Sometimes they were and sometimes not.

Materials Wasted

"For instance, if we needed what we would estimate as one pound of nails to complete a job, we got two pounds to make sure we would have enough. If we would need two feet of pipe, we took the first piece we laid hands on even though it was six feet long. What became of the other pound of nails and the four feet of pipe? They stayed close to the job until they were rusty, rarely were they returned to their proper place.

"If a job was completed which left a pile of boards, bricks, sand, chips or refuse of any kind, it remained where it lay until it had to be removed. I use these illustrations because they are memories, and vivid ones. How will cleanliness prove economy? In the first place, a clean plant creates a better satisfied employee. He gets an appetite for work, just as his stomach creates a keener appetite for food when he enters a clean, savory restaurant.

"A neat and clean plant is an efficient plant. Material should be stocked in an orderly manner, so that no time is lost in trying to find it. Materials should be placed in such a manner or in such a place that their handling is easily facilitated without interfering with other work. Take pride in the appearance of your work bench or character of your work.

"There is always a better way to do some things, no matter how highly perfected one might believe the present state of affairs."

Operations of Plants at Niles, Ohio

All eight mills are being operated by the Falcon Steel Co., Niles, Ohio, a sheet interest, with unfilled orders sufficient to engage its capacity into June. The Falcon Tin Plate Co., controlled by the same interests, is operating six of nine tin plate mills at its Canton plant, acquired from the Carnahan Tin Plate & Sheet Co. It is also rolling some specialty sheet stock at Canton for enamel ware. General offices of both companies are housed in a modern brick building located at the entrance to the Niles property.

A four-mill addition to the plant at Niles is being considered by the company, but an official states it is

undetermined whether construction will proceed this year, depending altogether on the situation in the sheet market. The additional capacity is desirable, an official points out, because a 12-mill plant could be operated as economically in many respects as an 8-mill plant, with no additional overhead.

Virtually all of the operations carried forward at the Niles property are done mechanically, the mills ranking among the most modern in the country in this respect. Manual labor has been reduced to a minimum. Running full, the company is able to produce 7000 tons of blue annealed, black and galvanized sheets per month. Its plant consists of seven sheet mills and one jobbing unit, with roughing mills, cold mills, pickling and galvanizing equipment. It has three galvanizing pots.

The two companies purchase their sheet bar requirements in the open market and are covered by long-time contracts.

The Falcon Tin Plate Co. is adding new connections in addition to the regular customers of the old Carnahan company and its business is gradually growing. Its plant consists of a roll train of nine hot mills and one cold mill, driven by two steam engines, and four tandem cold mills, electrically driven. It has black and white pickling departments and ample annealing capacity. It will produce between 40,000 and 45,000 tons of tin plate per year, or between 800,000 and 900,000 base boxes.

The Niles plant is entirely electrically driven. At Niles the company owns a 114-acre tract, and 13 acres at Canton.

Sales of both companies are being handled at present by Lloyd Booth, president and treasurer and by Paul Wick, vice-president and secretary. Both were formerly connected with the Trumbull Steel Co. at Warren in official capacities.

Serious Labor Troubles in China

WASHINGTON, March 28.—Prime importance is attached by Commercial Attache Arnold, at Peking, in a cable to the Department of Commerce summarizing conditions in China as of March 19, to the strike settlement between the Chinese Seaman's Union and the shipowners at Hongkong. The strike itself paralyzed foreign trade in South China, partially stopped ocean-going traffic, and, excepting junk trade, also inflicted heavy losses on shipowners engaged in river traffic, and on many merchants and producers at Canton and its hinterland. The strike settlement, accomplished through arbitration, brought about a recognition of organized labor through the granting by the Hongkong Government of the privilege of registration of labor guilds as members of the union, the granting of reasonable but higher wages, and the assurance that in the future the union would resort first to arbitration on all questions of remedy for any substantial grievances.

High Wages in Australia

Trade Commissioner Sanger cables to the Department of Commerce from Melbourne, Australia, that the Newcastle Steel Works of the Broken Hill Proprietary Co. will close completely in the middle of April. No reason for the closing is given, but it is believed by Trade Commissioner Ferrin, who recently returned from Australia, that it is part of the commonwealth-wide campaign on the part of employers to obtain a reduction in labor costs, which have been repeatedly declared by the Broken Hill and other interests to be unduly high, in view of the depressed markets for metals and metal products. The Broken Hill mines have been working part time for a long while, and practically all the other mines in the commonwealth, except coal, have long been closed. This view of the cause of the Newcastle shutdown is strengthened by Mr. Sanger's cabled statement that the conference of representatives of capital and labor from the six States, called by the Prime Minister, has broken up without practical results, and that labor unrest and strikes are anticipated.

More Metal Workers at Higher Wage

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for February a gain of 10,545 employees in 108 establishments. This gain of 9.3 per cent was accompanied by a gain of 15.3 per cent in amount of payroll and a corresponding gain in the February pay envelope from $40.20 to $42.57, or 5.9 per cent.

In the automobile industry the gain in 49 establishments was 4.8 per cent in number of employees and 58 per cent in payroll total. This is probably a reflection of an increase in full time employment, rather than wholly an increase in wage rates. In car building and repairing there was a loss of 3 per cent in number of employees in 64 establishments, but a gain of 10.5 per cent in amount of payroll, due probably to increase in percentage of full time workers.

Wages in car building and repairing, due to the continuance of war time wages in railroad repair shops, are considerably higher than in the other industries mentioned. The excess in February over steel mill wages was 37.8 per cent, and over wages in automobile plants 8.1 per cent. Details are shown in the table.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
January, 1922...	108	113,656	$4,568,269	$40.20
February, 1922..	108	124,201	5,286,929	42.57
February, 1921..	109	144,679	9,393,391	64.93
*Automobiles**				
January, 1922...	49	85,524	3,335,828	39.00
February, 1922..	49	89,647	4,863,720	54.25
February, 1921..	48	58,536	2,762,104	47.19
Car Building and Repairing				
January, 1922...	64	58,787	3,025,456	51.47
February, 1922..	64	57,006	3,343,661	58.65
February, 1921..	63	62,878	4,220,035	67.12

*Payroll figures are reported as "weekly"; they have been made "semi-monthly" by multiplying by 2 1/6.

Gratifying Accident Reduction

"Every employee in our mills is to be congratulated on the excellent showing made in accident reduction during 1921," states J. M. Woltz, safety director of the Youngstown Sheet & Tube Co., Youngstown, Ohio, in a message to workers. "It is gratifying to the safety department because it proved what we have shown before, that accidents can be cut down if a real effort is made by all hands to do so. It has saved hours and days of suffering, physical pain and has relieved our employees and their dependents many hours of mental stress."

During 1920 there were 11 fatal accidents at the company's plants, and but one in 1921. So far this year there has been none.

"Let every man in the company strain each nerve, let him be ever vigilant, let him condemn in unmeasured words the chance-taker that may endanger his own or other's life," admonishes Mr. Woltz.

Less Unemployment in Pennsylvania

Reports of all of the employment offices of the Pennsylvania State Department of Labor and Industry, covering the first two weeks of March, show a fairly good decrease in the number of idle workmen. According to the estimates, the unemployed decreased 15,575, or approximately 5 per cent. The total number of unemployed in the State is now estimated at 262,965, as compared with 278,540 two weeks ago. The Pittsburgh district reports the biggest increase in the number of men returning to work, with a total of 2050. Johnstown, McKeesport, New Kensington and Altoona, where conditions during the winter were considered bad, report an approximate increase of employed of more than 4000. Civic co-operation in Erie has reduced the number of unemployed; the estimated number idle is now placed at 16,490, a decrease of 610 in two weeks. Philadelphia reports 148,000 idle as compared with 153,400 two weeks ago, while both Harrisburg and Williamsport also show decreases in idleness.

The British Institute of Metals

Discussions on Corrosion of Condenser Tubes, Cold Work in Cupro-Nickel, Grain Growth and Researches on Non-Ferrous Alloys

(Special Correspondence)

LONDON, March 17.—The discussions of the papers presented at the annual meeting of the Institute of Metals, last week, of which a first report [IRON AGE, March 23] was sent previously, showed that many problems of non-ferrous metallurgy are now approaching solution as a result of the vigorous research work carried on by several prominent investigators. On the practical side, the question of condenser tube corrosion has been so fully studied that makers and users now have available a mass of the most valuable information. On the purely theoretical side, the paper of special note is that by Dr. Hanson and Miss Gayler who are now able to put forward a new diagram of the aluminum-zinc alloys which definitely replaces those hitherto relied upon, notably that by Rosenhain and Archbult.

Some incidents in the discussions made it clear that there are two schools of thought in regard to the publication of scientific work. One school holds that theories should not be advanced to explain experimental facts until the evidence of the accumulated data is overwhelming. The other holds that experimental results should not be published without reference to some theory which need not necessarily be universally accepted and which, in exceptional cases, may merely be a bright brain-wave of the author, subject to subsequent and painful psycho-analysis by his skeptical colleagues. Perhaps it might be hinted that there may be a third school, not represented in the discussion; whose original theories, stripped of all camouflage, are indistinguishable from those of other people and whose experimental data are as reliable as the theories so sternly barred by the first school. As the saying goes, it takes all sorts to make a world.

Corrosion and Protection of Condenser Tubes

Dr. Bengough's "Notes" on the above subject, which were published in the last issue of the institute's *Journal*, can be obtained in pamphlet form, and should be in the hands of every engineer who is not completely satisfied with the service given by the tubes in his condenser plant.

Among the points brought out by the author may be mentioned the appearance of coppery spots in the tubes, and it is stated that the occurrence of such spots is not dependent on good or bad mixing of the copper and zinc in the crucible, but is the result of purely corrosive action, the copper being re-deposited from solution. The author distinguishes carefully between causes of trouble which fairly can be held to be due to the tubes and those which are due to the conditions in which they are placed, and then considers what measures can be taken to palliate such troubles. The causes of trouble due to the tubes are given as: (a) laminations, spills, etc., (b) faulty composition, (c) unsuitable crystalline structure, (d) mechanical failure, e.g. collapse under packing, splitting, season-cracking, etc. A large number of causes due to external conditions are given. The corrosion which results may take one or two forms, viz.: (1) complete corrosion, i.e., both copper and zinc being attacked and either removed in solution or converted into basic salts; (2) selective action or dezincification, in which apparently only the zinc is attacked and the copper left *in situ*. Various means for protection or prevention of corrosion are given, together with a useful table of memoranda.

Discussion

SIR GERARD MUNTZ drew attention to the fact that Dr. Bengough's researches are now published in a suitable form and made accessible to the outside world. As regards pre-oxidized tubes, he thought these were worth a trial, but the surface film would probably soon be penetrated, after which the tube would be liable to failure like any other. The process would increase production costs, and would not be justified therefore unless thoroughly satisfactory. It was evident that no condenser tube yet produced was adapted to all conditions of service and users would save themselves much trouble and expense if they would bear this in mind when ordering. From the point of view of the tube maker, it was very satisfactory to note that, of the 18 possible causes of failure stated by the author, only four could be attributed to the tube, the others being due to the user or engineer. In the past the maker had usually been blamed for all the failures. He thought a higher price would probably have to be paid if the tubes were guaranteed not to exceed 0.1 per cent Fe, as suggested. At present they were usually somewhere around that figure, but if a limit were rigidly demanded it would add to the cost.

PROF. H. C. H. CARPENTER, who is the chairman of the corrosion committee, said the report was intended to be essentially a document for practical men, published at a nominal price. On Jan. 4, 2000 copies were printed, of which 1872 already had been sold, the admiralty having taken 1000 copies.

ENGINEER COMMANDER ALLEN asked if the effects of laminations and spills were entirely confined to those stated in the paper. It was satisfactory that the researches had shown the superiority of the admiralty tube for general purposes. One of the chief causes of corrosion was foaming, which took place at rates of flow over 6 ft. per second especially in water containing oil. Unfortunately in most cases speeds over 6 ft. per second were used in the Navy. Admiralty experience had been that electrolytic protective processes had not succeeded in preventing or stopping corrosion in cases where the conditions were not favorable.

DR. H. MOORE detailed experiments at Woolwich on low temperature annealing of various makes of admiralty tubes. He doubted whether the effects of the annealing recommended by Dr. Bengough were quite so negligible as the latter supposed. He had found a great drop both in Brinell hardness and yield point after annealing for three hours at 350 deg. C, and did not agree that this was a safe treatment for condenser tubes. For the remainder of the report he expressed very great appreciation.

R. T. ROLFE referred to differences in the specifications of various authorities, and to the appearance of coppery spots in new tubes. The latter he attributed in some cases to improper mixing in the crucible and thought that it complicated the right consideration of copper re-deposition in studying corrosion. He exhibited new tubes showing such coppery spots.

DR. W. ROSENHAIN, referring to the intercrystalline progress of dezincification, thought its extent or occurrence was probably due to the amount of stress present in the tubes. It was not a case of stress-cracking but corrosion, but removal of stress probably would prevent the occurrence. He did not agree with a statement of Dr. Bengough to the effect that the hydraulic testing of the tubes at a higher pressure than usual (i. e. at 1000 lb. per sq. in.) gave a good indication of the liability to intercrystalline corrosion.

DR. BENGOUGH, replying to the discussion, said there should be no difficulty about the limit of 0.1 per

cent Fe, as most of the analysis given by Dr. Moore showed. It should be easy to keep systematically within that limit. He emphasized the importance of water speed, on which depended the exact order of liability to corrosion of the various tubes investigated. There was some connection between small porosities and corrosion, but he had not found any relation between large laminations or spills and corrosion. In reference to annealing and the hardness of the tube, it must be hard enough to stand the pressure of packing at the end, and, if so, it was satisfactory. The treatment he had recommended left the tube sufficiently hard from this point of view.

Cold Work in Cupro-Nickel

The paper entitled "The Internal Mechanism of Cold Work and Recrystallization in Cupro-Nickel" by Frank Adcock, Teddington, was introduced by the author.

The problem was attacked in a conventional manner, by observing under the microscope the polished and etched surfaces of metal specimens which had been subjected to various degrees of cold working and heat treatment.

Cast cupro-nickel, annealed until homogenous, was selected as a suitable basic material, since good etchings were obtainable with the citric acid attack (electrolytic). The metal was able to withstand a considerable amount of cold working and yet was sufficiently hard to permit of rapid preparation for micro examination. Material which had been subjected to reductions of 50 per cent and 88 per cent by cold working was examined and observations were made on the nature and direction of certain strain planes which passed through most of the crystal grains of the distorted metal.

The possibility of a gradual distortion of the crystal structure apart from "slip" is also dealt with, and reference is made to the cavities which appeared on etching the worked material. In order to follow the process of recrystallization, cold worked specimens which had been annealed for fixed periods of time at progressively higher temperatures were examined microscopically. It was noticed that the first effect of annealing was the accentuation of the "strain" markings previously visible in the worked specimens, followed at higher annealing temperatures by the appearance of new crystal grains which were generally associated with the previously mentioned "strain" markings and occasionally with old crystal grain boundaries.

New grains which appeared on the sites of the "strain" lines were frequently elongated in the direction of these lines and not necessarily in the direction of rolling, and, further, the crystalline orientations of such grains were apparently not related to that of the old grain in which they were born.

A theory is put forward as an attempt to explain some of the experimental facts which are not altogether in agreement with the usually accepted views on the subject. The hardness of the cold worked metal as indicated by the Brinell test did not begin to fall appreciably until the annealing temperature employed was such that new crystal grains were readily discernible under the microscope.

Discussion.

DR. F. JOHNSON showed lantern slides of cold rolled copper exhibiting the same type of slanting etch-bands as found by the author, and also etch-bands in beta brass, showing faulting and the greater readiness with which they could be revealed after low-temperature annealing. Slight attempts at recrystallization were also evident.

MISS ELAM referred to the excellence of the author's experimental methods and micrographs, and said the paper confirmed the results of previous workers that recrystallization is always associated with some boundary or interruption in the crystal structure. She suggested that the etch-bands were really very fine twins similar to the Neumann lines in iron, and showed lantern slides to demonstrate that this was the case in silver. She regretted that the author had gone rather deeply into a speculative theory after his very excellent experimental work.

DR. ROSENHAIN said that he disagreed most violently with the concluding remarks of the last speaker—and he evidently meant what he said. The time had come, he believed, for putting forward theories, however hypothetical, rather than merely accumulating dry experimental facts. He exhibited lantern slides to negative the idea that the etch-bands were due to twinning; they were rather slip-bands with a thin amorphous layer. The new crystals grew in such amorphous material, either in the bands or on crystal boundaries, depending largely on the strength of the solid solutions in question.

PROF. F. C. THOMPSON, Manchester, agreed with Dr. Rosenhain that the view that the bands were Neumann lanellae was, in this case, quite untenable.

MR. ADCOCK, in reply, said he thought slip lines in beta brass must be fundamentally different from the rather fuzzy lines in cupro-nickel, but declined to be drawn out on the subject of Neumann lanellae.

Studies in Grain Growth

A paper entitled "The Effect of Impurities on Recrystallization and Grain Growth" was contributed by the research staff of the General Electric Co., London, and was introduced by Major C. J. Smithells, who conducted the work.

This research was undertaken to determine the effect of small quantities of impurities in tungsten on the structure developed on annealing. Tungsten wires were prepared containing accurately known quantities of thoria, alumina, silica, lime, and the alkali metal oxides, in various proportions. The progressive changes in crystal structure on annealing at 2500 deg. K were followed in each case, and the distribution of the impurities in the metal determined. It was found that the refractory oxides, which ultimately segregate in the grain boundaries, exert a definite resistance to grain growth, depending upon the nature and amount of oxide present. The alkali metal oxides alone have no influence upon grain growth. An entirely new type of exaggerated growth has been found, however, to take place on annealing tungsten containing a few tenths per cent. of both a refractory oxide and an alkali metal oxide. Single crystals occupying the entire cross-section of the wire, and three hundred times as long as their diameter, are formed on annealing for a fraction of a minute.

The authors put forward a hypothesis based on the idea that crystal growth and recrystallization in metals depends on a difference in vapor pressure between neighboring crystal grains. On this hypothesis the new type of exaggerated grain growth is satisfactorily explained.

The authors then proceed to a critical survey of published work on recrystallization and grain growth from the point of view of the vapor pressure hypothesis. They show that it explains the known phenomena in relation to the effect of strain, grain size, and temperature in regulating recrystallization and grain growth on annealing.

Discussion.

PROF. CARPENTER, who was the only speaker, said the special features of the work were very high temperatures and material admittedly non-homogeneous, Under those conditions the authors' theory can be regarded as plausible. The authors, however, had applied to metals in general their theory which was based on these special conditions. This was a typical example of what Miss Elam had meant in her observations in an earlier discussion. The only metal which showed any appreciable vapor pressure at the temperatures at which alloys were ordinarily worked and studied was zinc. Assuming, however, that metals in general did exhibit appreciable vapor pressure at such temperatures, the speaker proceeded, clearly, logically, and with commendable restraint, to demolish the theory put forward by reference to admitted facts and the accepted evidence of other workers. By the time he had reached his "fourthly" the meeting was divided between admiration for his controversial clarity and sympathy for Major Smithells. He showed that, even if the theory were capable of general application, it involved four assumptions which were open to grave objection.

MAJOR SMITHELLS, in reply, claimed that his hypothesis accounted for facts in crystal growth which were not accounted for by any other hypothesis. He thought Professor Carpenter had taken the expression "vapor pressure" a little too literally, and explained that it was a question of the amplitude of vibration of the molecules rather than, necessarily, the actual development of vapor pressure.

Season Cracking in Condenser Tubes

DR. H. MOORE and S. BECKINSALE, Woolwich, presented a paper on "Further Studies in Season Cracking and Its Prevention; Condenser Tubes."

The work reported in the paper was carried out with a

view to the application to admiralty condenser tubes of the low temperature annealing previously recommended by the authors for the removal of internal stress in brass and the consequent prevention of season cracking. Split tubes showed the usual characteristics of brass which had failed by season cracking. The properties of condenser tubes of eight different makes and also of a quantity of tube purposely made by methods inducing a state of high internal stress were determined before and after annealing at temperatures in the range of 50 deg. to 325 deg. C. By numerous annealing experiments on flat strips of condenser-tube brass elastically bent to an arc of a circle and thus initially stressed to a known amount the effects of initial hardness, initial stress, time, and temperature on the reduction of initial stress by low-temperature annealing were separately determined quantitatively. It was shown that:

1. The rate of reduction of stress at the lower temperatures is fairly rapid at first, but becomes slow when the stress has been considerably reduced.

2. As the temperature is raised the rate of reduction of stress increases.

3. The higher the initial stress, the higher is the remaining stress after a given treatment, in condenser tube brass of the same hardness.

4. The higher the hardness of the brass, the lower is the remaining stress after a given treatment and for a given initial stress.

The elastic limit and yield point of cold-worked condenser-tube brass were found to be raised by treatments which would greatly reduce initial stress,, a temperature of 250 deg. to 275 deg. C. being the most effective in restoring elasticity in the overstrained material. The Brinell hardness of condenser tubes is commonly between 140 and 160, having been raised considerably by the final cold-drawing. Treatment at 280 deg. to 300 deg. C. for 30 minutes is recommended for condenser tubes. This treatment reduces any initial stress present to a safe limit without injury to and in some cases with marked improvement in the strength of the tube.

Discussion.

DR. MOORE said he was not in favor of going as high as 350 deg. C. for annealing, as recommended by Dr. Bengough, owing to the weakness incurred.

R. T. ROLFE pointed out that service failures due to splitting were extremely rare, and contended that in this respect the state of manufacture had advanced as far as was practically and commercially possible. His firm (Allens, of Bedford) had been making condenser tubes for over 40 years and had never once had a split tube.

SIR GEORGE GOODWIN maintained that splitting was a nuisance in the Navy. Although only 21 tubes had split in one year, they would probably be in 21 different ships. The failures might be small in proportion to the total number of tubes used, but they were extremely inconvenient. He had great faith in Dr. Bengough's pre-oxidizing process as regards corrosion and in Dr. Moore's low-temperature annealing as regards season cracking, and would be glad if these authorities could agree as to the right temperature for annealing.

Other Papers

The following papers were also submitted to the meeting:

"The Rate of Combination of Copper and Phosphorus at Various Temperatures." By Prof. C. A. Edwards and A. J. Murphy.

"Some Cases of Failure in 'Aluminum' Alloys." By W. Rosenhain.

"Some Mechanical Properties of the Nickel-Silvers." By Prof. F. C. Thompson and Edwin Whitehead.

"A Further Study of the Alloys of Aluminum and Zinc." By D. Hanson and Marie L. V. Gayler.

"The Assay of Gold Bullion." By Arthur Westwood.

In the course of the discussions on the papers taken on March 9, the following observations were made: C. Billington said he saw little prospect of the price of phosphor copper being reduced, as it was already at pre-war level. S. Pile thought not enough attention had been given to the question of the surface of nickel silver, and the manufacturers had a great demand for a metal combining sufficient ductility to withstand the work required, with a surface which could be burnished and polished. In this connection W. B. Clarke recommended the common-sense method of bright-annealing by which, he said, the non-ferrous metal industry could save literally thousands of pounds per annum. Although this method was now being largely used, he had had samples in which the attempts to get a good polished surface had removed about 15 per cent of the metal.

Equipment Sold by Emergency Fleet Corporation

WASHINGTON, March 28.—Large quantities of equipment at Wilson's Point, Conn., and Hog Island, Pa., recently have been sold by the Emergency Fleet Corporation. The stiff leg derricks at Hog Island have been sold to the Electric Hoist & Derrick Co. of Baltimore and the contract signed. The sale comprises 43 derricks on the ground, 400 derricks on towers, 220 steel towers, all sash and doors in buildings on shipways, but not including the buildings, and all hoists, motors, electrical wiring, conduit, spare parts for motors and derricks on the 50 shipways. A sale has also been consummated with Fraser, Brace, Ltd., of Montreal, Canada, which totals $48,000 and covers various materials such as 1400 hp. engines, winches, steering engines, twin beam air pumps and miscellaneous ship equipment.

Perpetual Inventory Urged

WASHINGTON, Mar. 28.—Improved methods in manufacturing establishments through application of the perpetual inventory or stores control system is strongly urged by the fabricated production department of the Chamber of Commerce of the United States. A practical treatise on the subject has just been issued by the department under the title of "Perpetual Inventory or Stores Control." It goes at length into the advantages of perpetual inventory and carries a series of illustrated forms. It is intended to convey a message to the business interests of the country, showing the benefits to be derived from the perpetual inventory instead of the annual physical inventory "with its general disorganization and shutting down of the plant." By the term "stores" the report refers to raw and semi-finished material; "perpetual inventory" and "stores control system" are used interchangeably while "perpetual inventory form" is used synonymously with "stores ledger and balance of stores form."

High Freight Rates Denounced

WASHINGTON, March 28.—Declaring that high freight rates constitute the largest single factor in the cost of products delivered to consumers, President McClure, of the National Wholesale Lumber Dealers' Association, at its thirtieth annual convention here last Wednesday, demanded the repeal of the Adamson 8-hr. law as the only means to break the deadlock which he said exists in the business situation. He asserted that the law is vicious and "the public must devote itself to the saving of our transportation system from the clutches of organized workers, who are demanding that they be maintained as a preferred laboring class."

Mr. McClure said that there are many reasons for believing that 1922 will show a substantial improvement in business over 1921, even though that improvement may come so slowly as to be scarcely perceptible.

Alfred Sohland, of Harrisburg, Pa., was elected president of the Harrisburg Foundry & Machine Works at its annual meeting last week. He succeeds Christian W. Lynch who resigned after having served many years. Other officers elected were: A. J. Jarrett, vice-president; E. M. Lee, secretary; and B. E. Taylor, treasurer. Directors elected by the stockholders were: Alfred Sohland, William Jennings, Christian W. Lynch, B. E. Taylor, Benjamin T. Allen, A. T. Jarrett, and E. M. Lee. The usual semi-annual dividend at the rate of 7 per cent per annum was declared at the meeting.

F. R. Phillips & Sons Co., Pennsylvania Building, Philadelphia, has booked an order for 120 box cars for Brazil.

TUNNEL CONTRACT AWARDED

Booth & Flinn Successful Bidders—Bethlehem and Davies & Thomas to Cast Segments as Stated by The Iron Age

Contract for the construction of the Hudson River vehicular tunnel was officially awarded to Booth & Flinn, Inc., 17 Battery Place, New York, at a joint meeting of the New York and New Jersey tunnel commissions, at the Hall of Records, New York, March 28. As was exclusively stated in THE IRON AGE of March 2, the gray iron segments for tunnel lining will be divided between the Bethlehem Steel Co. and the Davies & Thomas Co., the former casting between 58,000 and 60,000 tons and the latter, the remainder, between 46,000 and 48,000 tons.

While the Bethlehem Steel Co., as stated in the previous article, will supply its own pig iron, the Davies & Thomas Co., it is now authoritatively stated, will in all probability contract with the Empire Iron & Steel Co. for the major portion of its requirements.

In addition to furnishing the major portion of the gray iron castings, the Bethlehem Steel Co. will cast about 10,000 tons of steel segments and will fabricate about 10,000 tons of structural steel required for the job. About 2,000,000 washers, 1,000,000 nickel steel bolts and 1,000,000 nickel steel nuts will probably be divided about equally between the Bethlehem Steel Co. and the Pittsburgh Screw & Bolt Co.

Merger May Be Abandoned

YOUNGSTOWN, OHIO, March 28.—Well-defined reports from apparently reliable sources are in circulation that the so-called small steel merger, involving the Youngstown Sheet & Tube Co. and the Inland Steel Co. and the Steel & Tube Co. of America, both of Chicago, has virtually been abandoned. In the absence of President James A. Campbell of the Sheet & Tube Co., who is at Hot Springs, Ark., such reports still lack confirmation. It has been intimated for some time, however, that serious obstacles had been encountered in the negotiations. Furthermore, independent executives say that industrial improvement, permitting the various interests again to operate profitably, will militate against an amalgamation at this time.

Steady Improvement at Youngstown

YOUNGSTOWN, March 28.—Ingot output continues at a comparatively high rate in the Mahoning Valley, with 55 of 61 open-hearth furnaces melting, and two of three Bessemer departments active. Finishing mill schedules are likewise stronger, averaging fully 70 per cent. Twelve of 17 pipe furnaces are fired, 69 of 113 sheet mills are rolling, while tin plate and strip capacity is occupied close to normal.

I. Lamont Hughes, district superintendent of the Carnegie Steel Co., states that the Ohio Works, McDonald mills and Union mills are averaging 90 per cent. The company contemplates lighting the sixth blast furnace in the Ohio Works complement.

Due to virtual exhaustion of its ore supply and accumulation of iron, the A. M. Byers Co., Pittsburgh, planned to blow out its Mattie stack at Girard, Trumbull County, this week. The company has a large tonnage of iron on hand which will enable it to continue the operation of its puddle mills.

An operating executive of the Republic Iron & Steel Co. states that orders are being accumulated for the Bessemer department, and there is a possibility of its resumption, following an extended idleness, during the latter half of April. The company is operating at an average of 60 per cent.

But for the impending coal strike additional blast furnaces would be started by the Republic company and by the Brier Hill Steel Co. One of these interests has sounded out the market with reference to purchase of a round tonnage of basic iron, but has evidently decided to blow in another furnace instead.

The open-hearth furnace schedule this week in the Mahoning Valley is: Youngstown Sheet & Tube Co., 9; Republic Iron & Steel Co., 11; Brier Hill Steel Co., 10; Trumbull Steel Co., 6; Sharon Steel Hoop Co., 4, and Carnegie Steel Co., 15.

Steel plant operations in the Shenango Valley show steady betterment. The American Sheet & Tin Plate Co. is operating 26 tin mills and eight sheet mills. Orders have been issued to blow in April 3 two of three blast furnaces at the Farrell, Pa., works of the Carnegie Steel Co. On April 10, 11 open-hearth furnaces will start, also the blooming mill and bar mill.

Enlarged mill activity is likewise reflected in the improved movement of loaded cars by trunk lines. During the first half of March, an average of 25 per cent more loaded cars were moved than in the corresponding period a year ago and 10 per cent more than during the first half of February in the Mahoning Valley.

Engineering Advertisers' Association

At the recent annual meeting of the Engineering Advertisers' Association, Chicago, the following officers were elected—President: Julius Holl, advertising manager Link-Belt Co., succeeds Keith J. Evans of Joseph T. Ryerson & Son; vice president: J. B. Patterson, P. H. & F. M. Roots Co.; secretary: H. N. Baum, advertising manager Celite Products Co.; treasurer: C. H. Connell, advertising manager Weller Mfg. Co.

JULIUS HOLL

Mr. Holl has been advertising manager of the Link-Belt Co. for 10 years. During the war he was head of publication section of the Emergency Fleet Corporation, handling the poster campaign and the publicity work of the corporation. Later he was made assistant to Chas. Piez, director general of the Emergency Fleet Corporation.

Mr. Patterson is a graduate mechanical engineer. After completing Carnegie School of Technology, he spent several years in engineering work, then entered the employ of the P. H. & F. M. Roots Co., Connersville, Ind., as sales engineer. Several months later, he was appointed district sales manager with headquarters at Chicago. For the past four years, he has been in charge of the Roots advertising in addition to his sales duties.

This completes the third successful year of the Engineering Advertisers' Association. This organization is continually growing and becoming of more and more service and value to the technical engineering advertiser in the Middle West. It is now publishing a magazine, known as the *E. A. A. Bulletin*, which has a circulation of 1000 a month. Copies will be sent to any technical advertiser upon request.

Ohio State Foundrymen's Association

The first annual meeting of the Ohio State Foundrymen's Association will be held on March 31 at the Hotel Deshler, Columbus, Ohio. There will be two sessions, the first commencing at 9:30 a.m., and the second at 2:00 p.m. At the morning session, reports of the officers will be submitted and the election of five directors will take place. The report of the committee on uniform foundry practice will also be taken up and discussed. The officers for the year will be elected at a meeting of the directors to be held at noon. At the afternoon session, Malcolm Jennings, secretary of the Ohio Manufacturers' Association, will deliver an address to be followed by W. W. Lewis, assistant superintendent of the open-hearth department of the American Rolling Mill Co. The latter's address will be illustrated by moving pictures.

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ESTABLISHED 1855

THE IRON AGE

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Open Price Decision Needed

What reviving business greatly wants is a decision in a test case on the open price trade associations. We may have it if the Supreme Court grants the request for a rehearing of the American Hardwood case. The Administration cannot interpret laws covering the restraint of trade, however desirous of assisting business. Fear persists that the conditions in the hardwood case have a general application in prohibiting the compiling of prices or even of statistics, and no authority exists to dispel the fear, save through a broad Supreme Court consideration.

Meanwhile, competing businesses, having only partly learned the lessons of proper cost keeping, of approved forms of contract, of standardization and finally of price stabilization, may be left to drift as formerly, subject to the devices of shrewd purchasers and the costly mistakes of poorly informed sellers. Inefficient enterprises hurt the community in the long run, and it is to be hoped, therefore, that those open price associations which have been conducted on the best lines and without studying constantly how far they can go and still keep within the letter of the law will not give up without a real try-out.

There are some groups of manufacturers whose activities are so numerous and important commercially as to justify any concern's support for what it may get back; but there is no gainsaying that for the average company reliable knowledge of what competitors have done in the way of prices has been a compelling inducement for membership. According to the views of official Washington, statistics of prices, of stocks, of production and the like ought to be made readily available for publication and not merely for the benefit of the associated group, and it is further held that publication will not interfere with the orderly, rational and safe development of association interests. Undoubtedly the Department of Commerce would agree that a return to the ignorant competition of the days of mutual suspicion would be disastrous, but its official utterances are necessarily tempered. Doubtless the department recognizes that the situation is not fully met by its suggestion that trade groups collect statistics for publication by the department, but this is as far as it could go in the desire to be of help.

The open price association was not established solely as a price-fixing institution but as a guiding agency in legal, commercial and financial matters. Whatever may be done to encourage associations well within the law to maintain or to resume their wonted activities is bound to aid in the quest for business, now important internationally as well as at home.

Independence in Mining Journalism

The *Engineering and Mining Journal*, New York, and the *Mining and Scientific Press*, San Francisco, are to be consolidated and on April 1 the first number of the *Engineering and Mining Journal-Press* will be issued at New York. The *Mining and Scientific Press*, under the editorship of T. A. Rickard, has been a conspicuous example of personal journalism, of which there is little in the technical or business field. Mr. Rickard has been free with criticism—most of it merited—and his mordant style has furnished his readers constant stimulus. In his conduct of the paper courage and outspokenness have been joined to high ability. He remains at San Francisco as contributing editor of the consolidated paper under a three-year arrangement.

The *Engineering and Mining Journal* refers to the two papers as "now consolidated for self preservation and for a bigger manifestation of the independent journalistic principle." That the expansion of *Mining and Metallurgy*, the organ of the American Institute of Mining and Metallurgical Engineers, into a direct and aggressive competitor of independent mining journals had much to do with the merger is indicated in the article by the question, "We wonder if the mining industries realize what they would lose if independent journalism should suffer further injury?"

Some of the engineering societies, after gaining numerical strength, in part by the help of technical and industrial publications which have been built up on their merits, have thought to capitalize the buying power of their memberships by going into the publishing business. Call it endowment or subsidy or whatever else, this use of the resources of such societies to establish a competitive business was never contemplated in their charter grants. It is a question, moreover, how far membership sanction would be given to these publishing enterprises if they were made the subject of a referen-

dum. What has just taken place in the mining field may start some thinking on aspects of the matter that have not had much attention.

Basing Point Testimony

The hearings under the auspices of the Federal Trade Commission of the complaint against the United States Steel Corporation in what has come to be known as the Pittsburgh basing point, or "Pittsburgh plus" case, have continued for a number of weeks, with proceedings in Washington, Milwaukee, Minneapolis and Chicago, and the hearing is to be resumed in Chicago, April 3. The testimony has become monotonous. With large expenditure of time, money and energy, witness after witness has been placed on the stand to show that sales of steel products have been made at many points far distant from Pittsburgh, but comparatively near to mills in other districts, on the basis of the Pittsburgh price, plus the freight from Pittsburgh to the point of delivery. That was not news. It has been well known and admitted that the practice of adding the freight has been followed whenever the steel manufacturers were able to do this. Apparently the calling of so many witnesses has been with the thought of getting the effect of cumulative testimony.

The effort of the attorneys for the Steel Corporation seems to have been confined entirely to trying to show that, in spite of the Pittsburgh basing point practice, the companies with which the witnesses were connected have been able to carry on a profitable business. Under a recent decision, however, a large part of the cross-examination, bringing out business secrets of complaining witnesses, has been prohibited.

The real question in this controversy is as to the extent to which the custom of basing prices on Pittsburgh permits manufacturers to obtain higher prices than would otherwise be paid. In such periods of depression as the one which has prevailed for many months it is well known that the Pittsburgh basing practice has been ignored in other districts. This is shown in the quotations on shapes, plates and bars in THE IRON AGE'S Comparison of Prices. For a long time, Chicago has had prices of its own. For example, shapes, plates and bars, for a number of weeks, were quoted 1.50c., Chicago, and 1.35c. Pittsburgh. If the Pittsburgh basing point plan had prevailed, the price would have been 1.73c. Chicago, as the freight is 38c. At the present time, these products are quoted at 1.40c. Pittsburgh and 1.60c. Chicago.

If in periods of slack business little attention is paid in other districts to the Pittsburgh base, how much higher are the prices in times of prosperity, when the Pittsburgh plus plan is adhered to, than they would be if the basing point plan were abolished? That is a difficult question to answer. But whatever the decision finally made as to the technical procedure of quoting f.o.b. Pittsburgh, the extent to which buyers of steel in western and northwestern districts will benefit by proximity to steel mills will depend in the last analysis on the relation of supply and demand. Further building of steel works in the Chicago district will be one important factor. Another consideration is the success or failure of the plans that have long been worked on for the consolidation of large independent steel companies, including two important ones in Chicago territory.

The Steel Corporation in 1921

When 1921 was a year of such great shrinkage in market values, perhaps the most interesting item in the annual report of the United States Steel Corporation, issued last week, is the operation of the corporation's inventory reserve fund, 36 per cent of which was drawn upon during the year. The fund was accumulated during the five years, 1916 to 1920 inclusive, amounting altogether to $95,000,000, and an interesting feature of this accumulation is that the largest contribution, approximately $29,000,000, was made in 1919, the year of smallest earnings in the five, while only $5,000,000 was added in 1920, presumably because the fund was already practically large enough to cover all contingencies.

The 1921 withdrawals from the $95,000,000 fund included $14,284,198, applied at various times as inventory materials were used in the manufacture of products shipped within the year, and $20,005,548 used at the close of the year in writing down the inventory to market prices in force at that time. In the 1920 report it was stated that the fund, amounting on Dec. 31, 1920, to $95,000,000, represented that part of cost or market value in inventory which was in excess of unit prices therefor at Dec. 31, 1915. Thus the corporation is insured against inventory losses except in case there is shrinkage in values below the level at the end of 1915.

The operation of this inventory reserve kept out of the earnings statements for the years 1916 to 1920 inclusive any apparent earnings due simply to appreciation in cost or market value of inventory, while for 1921 and subsequent years it similarly keeps out of the earnings statements losses that would otherwise occur by shrinkage in market values. Thus the annual earnings have represented simply the results of actual manufacturing and other business operations.

The 1921 earnings, after payment of subsidiary company bond and mortgage interest, amounted to $92,726,058, while the production of steel for sale to outsiders was 7,860,334 tons. While the earnings are not made wholly on steel products, it is a common practice to divide the earnings by the steel tonnage, to secure an approximation of the earnings relative to production. For 1921 the apparent earnings per ton were $11.80, which is only a trifle less than the average of the three preceding years, similarly computed. Of course, it is to be considered that the amount paid as taxes was much less in 1921 than in 1918, 1919 or 1920. In each of the five years, 1911 to 1915 inclusive, the "earnings per ton," so-called, were less than $11.80, ranging approximately from $8 to $11.

Making comparison in another way, the reported earnings decreased by 47.5 per cent from

1920 to 1921, while the reported production, in steel for sale, decreased 44.8 per cent. This is a showing that would hardly be expected of a large steel manufacturing interest, on account of overhead expenses being so large in the steel industry. The incident illustrates in impressive manner how the Steel Corporation has reduced its overhead, relative to capacity, in 20 years. It will be recognized, of course, that there are overhead charges to be paid out of the earnings on which the preceding comparison is made, including sinking funds and corporation bond interest.

W e Steel Corporation's production of steel for sale decreased from 1920 to 1921 by 44.8 per cent, the decreases were by no means uniformly distributed. The largest percentage decrease was in axles, 76.8 per cent, to only 22,567 tons, while, naturally enough, there were particularly heavy decreases in semi-finished steel made for sale to outsiders. A surprising decrease is the 60.4 per cent in merchant bars, hoops and skelp, while the decrease of 58.9 per cent in plates seems quite natural.

On the other hand, sheets and tin plates held up fairly well, with a decrease of 36.4 per cent, and tubing and pipe very well, with a 31.2 per cent decrease. The palm, however, goes to the corporation's rail mills, which made 1,480,049 tons of rails in 1921 against 1,490,616 tons in 1920, the decrease being 10,567 tons or 0.7 per cent. The heavy production of 1921 was due, of course, to the policy followed in the matter of prices, the corporation being an early seller of rails for 1921 delivery at the old Industrial Board prices when its competitors were disposed to seek a higher price, while late in the year the corporation reduced its prices and made the reduction retroactive to Aug. 25.

The Forty-Hour Week

The move made by the Ford Motor Co. last week in the adoption of a 40-hour week, making Saturday a complete holiday, is not so great a departure as some comment has assumed. It was not uncommon for the Ford plant to be shut down on Saturday in the days when it was operating on the three-shift plan. In times like the present, when three shifts are not to be thought of, the 40-hour week has chiefly to its credit the making of places for about 3000 additional workers. Again the Ford management commends itself to favor by saying that in taking on these workers preference will be given to ex-service men.

It hardly need be said that the Ford company would not have adopted the 40-hour week had it not found a way to make the change without sacrifice of economy in production. In fact, the entire suspension of work on Saturday might put costs down. It needs to be pointed out, moreover, to those who have been calling for a 44-hour week as the next step after the establishment of the 8-hour day, that the 40-hour week at the Ford plant means 40 hours' pay and no more.

Eight years ago last January, when Henry Ford announced his three-shift plan, with $5 as the minimum pay for eight hours' work, he was careful to say that "this is not a plan for any company but ours." There is no great fear, in the present state of industry, that last week's announcement will increase the difficulties of other employers, as was the case in January, 1914. When anything like full employment comes again throughout the country, it is to be doubted if many workers will be satisfied in an employment giving them but 40 hours' earnings for a week's subsistence, saying nothing of laying by something for a rainy day.

Relative Lowness of Metal Prices

In a comparison with the general average of all commodity prices, as compiled monthly by the Bureau of Labor Statistics, it has been shown that metals are lower than any other item. The average for February shows the metals 23.8 per cent under the average of all commodities, while farm products are 16.5 per cent below the average and food products 8.7 per cent below the average. All other groups of commodities are above the average; cloths and clothing, together with fuels and lighting, being 21.1 per cent above, lumber and building materials, 33.8 per cent above and house furnishing goods 41.1 per cent above the average.

Operating across a long series of months, the metal prices are continually below the average by percentages ranging from 9 to 29. Not in two years, with the exception of one month last year, has any other group except farm products ranked lower in price than metals, and farm products are now considerably higher than metals.

All of this is based on the figures from month to month compared with figures in 1913 as par or 100. Like studies, using the ten years 1890 to 1899 as a base, show like results, though with considerably different figures. Thus, on that basis, the metals are now 28.2 per cent below the average, as compared with 7.3 per cent for food products. All other items are above the average, farm products being 2.4 per cent, cloths and clothing 11 per cent; house furnishing goods 23.3 per cent, fuel and lighting 27.6 per cent and lumber and building materials 50.3 per cent above the average of all commodities.

Testing Employee Representation

Employee representation plans have been subjected to severe tests during the past year, but the companies which have adopted them show no signs of changing their policy. The latest evidence to this effect is furnished by the annual report of the Bethlehem Steel Corporation, which says:

> During the present period of depression, the management has, through the employees' representation plan, received the helpful co-operation of its employees in making many necessary adjustments in employment conditions and in dividing positions and work to provide income to as many families as possible. By this method not only have the employees and the communities been benefited but the corporation has retained the nucleus of a force capable of immediate expansion to meet output demands upon resumption of normal business.

This would indicate that the association of workers in a representative capacity had the effect of making them less selfish. Naturally every man was anxious to do the best he could for himself and his family and many sorely need-

ed the employment which became so scarce. In the case of the Bethlehem Corporation the number of employees decreased from 93,964 in 1918 to 36,435 in 1921 and even then it was with difficulty that jobs were retained. But with the aid of the men, as above pointed out, it has been possible to keep a force of good size. Doubtless many of the incompetents have been weeded out and the nearly 40,000 remaining include the best workers. The report does not speak in this connection of the reductions in wages which became necessary, but they formed an important part of the history of an unhappy year, and it is known that in reducing wages as well as in making other adjustments the representation plan helped in meeting the situation.

American Ships in Foreign Trade

In the monthly summary of foreign commerce covering the figures for January, it is shown that American vessels brought in only 33 per cent of the value of imports and carried out only 38.9 per cent of the value of exports, as compared with 39.68 per cent of the imports and 36.27 per cent of the exports in January, 1921. Similarly, the seven months ended with January show a falling off in the proportion of our exports and imports handled in American vessels as compared with the seven corresponding months of the preceding year.

Singularly enough, however, the total tonnage of American vessels entering in the foreign trade is 50.42 per cent of the total of all vessels, while 51.45 per cent of the tonnage clearing in the foreign trade was represented in American bottoms. Evidently, therefore, the American ships actually engaged in the foreign trade are either less well loaded than the foreign ships or the unit values of their cargoes are much lower than with the foreign ships. Possibly both these influences are working together.

One reason for expecting firmness in steel prices at the present time is that producers have turned to cost sheets. Through all of 1921 and into 1922 these got little attention. A large fraction of the 1921 losses of $10, $20 and $30 per ton was a writing off of inventories. A major problem with many steel makers has been to sell against high cost raw materials. Events have shown an unexpected degree of foresight in some quarters that the recession in values would proceed throughout last year, and every opportunity was taken to reduce excessive stocks of ore or pig iron. Prices under such conditions were naturally a secondary factor, the wish being to have no more stocks than sufficient for the scale of operations existing at the end of the price decline. Producers, aware of the exhaustion of stocks in consumers' hands and fortified by adjustment of their own inventories, have shown in the last few weeks a definite policy of considering costs in building up back logs, let alone making fresh commitments.

The Interstate Commerce Commission has postponed from April 1 to May 1 the date to begin its investigation regarding the use by the railroads of power brakes and appliances.

STEEL CORPORATION POLICY

Judge Gary Says It Will Follow Others—Plants Operating at 70 Per Cent of Capacity

The following was given March 24 to representatives of New York newspapers by Judge Elbert H. Gary, in response to questions:

From the information I have gathered this morning, I believe the manufacturers of steel products generally have made increases in their selling prices within the last few days. This is not surprising because, as you all understand, the selling prices have been so low for some months that many, if not most, of the manufacturers have been losing substantial sums as a result of their operations. So far as I have been advised, and judging by my knowledge of costs and prices, I do not think the prices which have been established, or are being established at the present time, are high enough to permit many of the companies securing any profits whatever. However that may be, at your request I am willing to state what our attitude is.

As you know, since the prices of steel products generally have been less than the cost of production, it has been the practice of the Steel Corporation to make reductions only after others have made them. We have been followers, and not leaders, in making low prices that were unfair and unreasonable from the standpoint of the manufacturer; and in increasing our prices it is our present intention to follow others rather than to lead. If we find, as now seems probable, that other producers are adhering to their announced intention, as published in the newspapers and widely circulated, we shall undoubtedly follow suit, although we will not enter into any arrangement with anyone for doing so. We can always be depended upon to do the fair thing by our customers, our competitors and the general public; and whatever we do will be done openly. It will be our principle and policy to follow increases in the selling prices of others up to the point which we believe to be fair and reasonable and just to the purchasers, and not any further.

I have been surprised by the long continued disposition of some of our competitors to maintain prices so low that they were losing money even to the extent of millions per annum, as applied to some of them. They have not secured more business as a total net result and they have weakened their financial positions.

I believe the tendency of business is upward as to volume, and the position lately taken by our competitors should have a good effect in securing adjustments necessary to a proper return to a normal basis, although it is still a fact that the prices of many retailers and middlemen are too high and must be reduced before they will obtain the patronage to which they are entitled, and that the wages demanded by some of the trades are out of line and a great hindrance to enterprise and necessary construction. This is hindering building operations in a large measure.

However, in spite of some abnormal and unreasonable aspects concerning business matters, there is at present, apparently, a marked improvement. I believe our subsidiary companies are booking up to about 65 per cent of normal capacity and, on account of our old orders on hand, are operating at, at least, 70 per cent of our normal capacity.

The business men of this country have the opportunity to bring about honest, reasonable and fair business prosperity; and the action of the United States Senate in ratifying the work of the Washington conference will have a decided influence in accelerating and establishing a satisfactory basis.

As I have said before, if the public authorities will maintain the observance of the laws and thus secure to every individual the right to work in accordance with his opportunities and desires, and the people of this country will be industrious, economic and courageous, we need have no fear in regard to our business future.

At a special meeting of the board of directors of the Pittsburgh Rolls Corporation, Pittsburgh, the resignations of H. A. Brassert, F. H. Hardy and C. D. Tripp of Chicago, as directors of the corporation, and of H. A. Brassert and F. H. Hardy as members of the executive committee were accepted. C. C. Smith, J. P. Allen and G. W. Eisenbeis of the Union Steel Casting Co., Pittsburgh, were elected directors of the corporation to fill the vacancies and Messrs. Smith and Allen were elected members of the executive committee, succeeding Messrs. Brassert and Hardy. The changes are incidental to the recent transfer of control to the Union Steel Casting Co.

Iron and Steel Exports Fall Off Sharply

Heavy Drops in Steel Rails, Black and Galvanized Sheets, Tin Plate and Wire Nails Only Partially Offset by Gains in Bars, Wire and Structural Material

WASHINGTON, March 28.—Exports of iron and steel products and machinery and imports of iron and steel showed a slump in February when compared with January. Foreign shipments from this country of iron and steel in February totaled 133,975 gross tons, valued at $12,950,603, as compared with 160,920 tons, valued at $15,149,174, in January. Counting the 31 days in January and the 28 days in February the day-by-day export movements in these months averaged 5191 and 4785 tons, respectively. Iron and steel exports for February were slightly below those of December, which totaled 134,415 tons. For February of last year exports totaled 396,717 tons, valued $59,209,400. For the eight months ending with February of the present year the exports totaled 899,890 tons, valued at $109,013,294, as against 3,595,532 tons, valued at $508,504,783, for the corresponding period of last year.

Iron and steel imports for February totaled 11,145 tons, valued at $2,189,115, as against 13,138 tons, valued at $2,164,082, in January. For the eight months ending with February of this year imports totaled 93,751 tons, valued at $17,079,011. For February of last year imports totaled only 4635 tons, valued $2,204,492, and for the eight months last year the total of imports was 208,065 tons, valued at $32,964,467.

Exports of machinery in February were valued at $12,455,903, as compared with $17,243,134 in January. For the eight months ending with February of the current year machinery exports were valued at $124,232,799. For February of last year they were valued at $37,176,099, while for the eight months ending with February, 1921, they were valued at $214,801,815.

Manganese ore imports in February totaled 7204 tons, valued at $36,724, and for the eight-month period they totaled 125,683 tons, valued at $708,742. These figures compare with 53,874 tons, valued at $475,400, in February of last year and 493,968 tons, valued at $8 969,780, for the eight months ending February, 1921. Imports of manganese ore in January, 1922, totaled 9500 tons, valued at $47,614.

The outstanding feature of interest in connection with iron and steel exports continues to be the prominence of Japan as the chief foreign market. Japan was by far the greatest importer of plain wire, wire nails, galvanized sheets, black steel sheets, tin plate and rails. The total tonnage that country took of these products in February was 40,539 tons, which alone was practically 30 per cent of the total iron and steel exports in February. Exports to Japan of these same products for the eight months totaled 260,908

Exports of Iron and Steel—Gross Tons

	February		Eight Months Ending February	
	1921	1922	1921	1922
Pig iron	1,307	1,430	117,897	16,973
Ferromanganese	42	190	3,097	603
Ferrosilicon	2	45	523	312
Scrap	2,501	2,494	169,154	21,997
Ingots, blooms, billets, sheet bar, skelp	92	6,627	78,993	17,518
Iron and steel bars	41,764	10,187	466,101	17,333
Alloy steel bars*	....	579	.....	1,263
Wire rods	985	6,008	55,877	62,436
Plates, iron and steel	66,191	2,306	661,490	66,151
Sheets, galvanized	8,712	9,079	75,822	43,244
Sheets, black steel	14,371	18,794	124,865	173,754
Sheets, black iron	1,509	1,393	20,413	3,378
Hoops, bands, strip steel	3,649	2,855	33,270	13,467
Tin plate, terne plate, etc.	23,376	7,304	164,889	42,700
Structural shapes, plain material	65,012	3,407	432,741	71,135
Structural material, fabricated	3,462	5,640	30,609	11,449
Steel rails	59,390	14,093	431,823	128,721
Rail fastenings, switches, frogs, etc.	1,225	1,425	11,368	6,473
Boiler tubes, welded pipe and fittings	64,323	12,527	306,712	93,539
Cast iron pipe and fittings	8,102	2,453	59,534	17,032
Plain wire	13,086	10,035	153,176	33,780
Barbed wire and woven wire fencing	4,629	2,506	83,383	15,767
Wire cloth and screening*	....	64	.....	162
Wire rope and cable*	....	214	.....	254
Wire nails	4,129	8,397	69,864	26,780
All other nails and tacks	4,155	533	12,098	3,576
Horseshoes	104	37	1,346	361
Bolts, nuts, rivets and washers, except track	4,599	1,209	30,487	8,135
Car wheels and axles†	....	684	.....	....
Iron castings†	....	1,121	.....	1,570
Steel castings†	....	173	.....	....
Forgings†	....	153	.....	....
Machine screws†	....	13	.....	28
Total	396,717‡	133,975	3,595,532	899,890

*Not reported separately, prior to January, 1922.
†Previous to January, 1922, reported by value only.
‡Inclusion of several new items makes this higher than the figure previously reported.

Imports of Iron and Steel—Gross Tons

	February		Eight Months Ending February	
	1921	1922	1921	1922
Ferromanganese	854	1,041	39,952	6,212
Ferrosilicon	315	278	6,266	8,106
Pig iron	421	1,888	41,585	22,307
Scrap	1,921	2,254	77,003	26,404
Steel bars	189	346	3,808	2,646
Bar iron	198	276	3,394	1,739
Structural steel	34	205	1,092	797
Billets, without alloys	....	2,789	747	8,344
All other billets	....	97	.....	527
Steel rails	5	1,509	28,434	15,021
Sheets and plates	635	21	1,210	246
Tin and terne plates	36	418	295	714
Wire rods	27	23	4,279	688
Total	4,635	11,145	208,065	93,751
Manganese ore and oxide	53,874	7,204	493,968	125,683

Exports, January, 1920, to February, 1922, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	122,290	1,299	1,868
December	134,415	2,550	250
Calendar year 1921	2,213,042	28,305	10,363
January, 1922	160,920	1,043	4,683
February	133,975	1,430	6,627
Eight months	899,890	16,973	17,518

tons, or about 30 per cent of the total iron and steel exports for that period. While this shows that American producers have established a good market in Japan, at the same time it indicates a relatively small distribution of iron and steel exports to other overseas markets.

The following table shows the markets abroad which constituted the chief destinations of foreign shipments of some of the principal steel products, with Japan far in the lead, having taken 40,539 tons in February, and 260,908 during the eight-month period ending with that month, of the totals of these products:

	February, 1922	Eight Months Ending February, 1922
Galvanized Sheets		
Japan	4,189	13,117
Canada	770	8,302
British India	769	2,931
Philippine Islands	541	3,615
Black Steel Sheets		
Japan	15,935	144,831
Canada	2,216	15,910
Tin Plate		
Japan	3,862	25,612
Canada	1,586	14,857
Rails		
Japan	5,050	47,352
Honduras	2,543	10,273
Canada	2,002	21,503
Plain Wire		
Japan	5,669	16,028
Argentina	1,408	2,762
Canada	1,130	6,745
Wire Nails		
Japan	5,834	13,968
China	568	2,283

Industrial Teachers' Scholarships in New York

The University of the State of New York is offering 25 scholarships to qualified trade and technically trained persons who desire to prepare themselves for teaching. Persons selected to hold these scholarships who satisfactorily complete the prescribed one year resident industrial teacher training course are licensed for life to teach their specific occupations in the vocational schools of the State. The salaries paid vocational teachers now range from $1,800 to $3,500 per annum.

Each holder of a scholarship will receive at least $1,000 for the period of one school year. Holders will be required to be in attendance for ten months in the Industrial Teacher Training Department of the State Normal School at Buffalo.

Applicants must have had at least five years of successful all-round experience in work of not less than journeymen's grade in some trade, industrial or technical occupation and must be not less than 21 or more than 36 years of age on Aug. 1 of the year in which the appointment is made. The director of vocational and extension education, State Department of Education, Albany, N. Y., will furnish information and application blanks.

Merger in Hydraulic Prime-Mover Field

The plant and interests of the Pelton Water Wheel Co., San Francisco and New York, have been acquired by the William Cramp & Sons Ship & Engine Building Co., Philadelphia. The Pelton Water Wheel Co. will continue under the old corporate name, but will be newly officered by H. B. Taylor (vice-president of the Cramp company), president; Ely C. Hutchinson (formerly chief engineer of the Pelton company), vice-president and general manager; William M. Moody, second vice-president. The purchase combines two of the oldest companies in the United States manufacturing hydraulic prime movers. The I. P. Morris department of the Wm. Cramp & Sons Ship & Engine Building Co. has long been a builder of large reaction turbines.

The Worcester Pressed Steel Co., Worcester, Mass., this spring will install a tandem cold-rolling mill designed by the United Engineering & Foundry Co., Pittsburgh. Each mill will be driven by a 70 h.p. adjustable speed motor, and will have a speed of 201 ft. per minute. Adjustment will be by wedges instead of screws. A separate coiling machine is included in the new equipment.

BASING POINT HEARING

Testimony at Chicago Hearing Largely a Repetition of That Previously Taken

CHICAGO, March 25.—The Federal Trade Commission hearing on the Pittsburgh basic point practice which commenced at Chicago on March 20, continued through the week until Friday afternoon, when an adjournment was taken until April 3. The testimony offered was similar to that presented in the Milwaukee and Minneapolis hearings, the contention of each witness being that "Pittsburgh Plus" put his company at a disadvantage with Eastern competitors everywhere East of Chicago and sometimes even in this city itself.

Among those who testified were A. E. Norman, president the Automatic Screw Machine Products Co., Chicago; N. S. Lawrence, vice-president and assistant sales manager, the Whiting Corporation, Harvey, Ill.; Robert Ware, Ware Bros., Chicago, manufacturers of roller skates; James Hawkins, sales manager, Acme Boiler Co., Chicago, manufacturer of boilers, tanks and oil well machinery; Philip S. Graver, vice-president and T. C. Schroeder, traffic manager, the Graver Corporation, East Chicago, Ind.; Thomas P. Octigan, president Octigan Drop Forge Co., Chicago; A. I. Appleton, president Appleton Electric Co., manufacturer of outlet boxes, switch boxes and conduit fittings; E. M. Whiting, secretary and general manager, the Pheoll Mfg. Co., manufacturer of screws, nuts and miscellaneous wire products, and H. E. White, traffic expert, the Western Association of Rolled Steel Consumers.

Mr. Graver testified that Pittsburgh manufacturers competing with his company enjoyed advantages in nearly all markets in the country and in some cases, assuming their manufacturing cost to be the same, could lay down their products in Chicago at a lower price than his own plant. With the Pittsburgh basing point operative, he asserted, that the Pittsburgh manufacturer could beat his selling price on a $1,300 tank by $18 in Chicago itself and by $129 in Atlanta, Ga., to which Chicago has a lower freight rate than Pittsburgh. On a tank selling in Chicago for $7,500, he asserted, the Pittsburgh maker could also beat the Chicago price in almost all markets, his advantage ranging from $60 to $1,050 normally in competitive markets.

Mr. Lawrence of the Whiting Corporation cited a number of important contracts lost by his company in Havana, Cuba, in California and even in Chicago, because Eastern competitors were able to purchase their steel without the handicap of "Pittsburgh Plus."

About 300 witnesses are to be examined in the Chicago hearing; hence it is expected that the taking of testimony will not be completed for two or three months. As a result of a recent decision of the Federal Trade Commission at Washington, the scope of the inquiry has been broadened to include the trade practices of steel mills generally in addition to the specific practices mentioned in the complaint. The commission has also put a ban on cross examination to bring out the internal business secrets of the complaining witnesses, having held that these are privileged. In the previous hearings, the Steel Corporation attorneys sought to bring out admissions from the witnesses that their companies had prospered notwithstanding the Pittsburgh basing point practice.

Inquiry on Foundry Apprenticeship

The American Foundrymen's Association committee on industrial education and training of apprentices has sent a questionnaire to the members as part of its survey of the status of apprentice training in foundries. The questions relate to the kind of training given apprentices and suggestions as to new lines which should be undertaken. There are questions also on foreman training and on co-operation with the public schools in training apprentices, workmen or foremen. The secretary of the committee is Robert E. Kennedy, 909 W. California Street, Urbana, Ill.

Iron and Steel Markets

MARKET STRENGTHENS

Output Increases to a 65 Per Cent Average

Railroad and Structural Buying Still Lead—Large Car Requirements

The steel companies have gained ground in the past week in their effort to advance prices. The more active buying that dates from the second week of March has continued, and the rate of steel works operation is still climbing.

Apparently both producers and consumers of steel have been surprised at the rate at which buying has developed. Indications now are that March bookings will show the largest total since July or August, 1920.

The Steel Corporation's statement as to its policy, made late last week, tended to add strength to the market, but did not name definite prices. It is interpreted to mean that the corporation will follow promptly any advances established by its competitors. While some small sales of bars, shapes and plates have been made at 1.50c., Pittsburgh, the fact is that business is still being taken at lower figures where transactions were left open until April 1.

With only three days remaining before the closing down of union coal mines the steel trade shows little change in its attitude, the opinion still prevailing that no serious fuel scarcity can be produced. Some producers of steel hesitate to blow in additional blast furnaces, not for fear of curtailment of their own operations, but from uncertainty as to the fuel supplies of their customers.

Steel Corporation expansion in pig iron output is even greater than was indicated last week. Instead of six blast furnaces resuming, the revised schedule calls for the starting up of nine, the other three being at Clairton, Edgar Thomson and New Castle. One Republic stack will blow in next week.

The Steel Corporation's operating rate continues this week on the 70 per cent basis indicated in Chairman Gary's statement of last week, and its recent bookings are put at 65 per cent of capacity. Independent companies are probably averaging 60 per cent in production, putting the industry as a whole at about 65 per cent.

The uppermost consideration with both producers and consumers is whether in the wake of the large business put on the books at low prices there will be buying sufficient to sustain the price advances. Jobbers are now supplied for three or four months. Generally manufacturers have not bought that far ahead, apart from car and structural contracts.

Railroad equipment buying is heavy and more is in prospect. The 4000 Norfolk & Western cars just placed and the 4000 for the St. Paul represent 120,000 tons of steel. Pending inquiry points to very substantial contracts ahead, the New York Central needs being put at 15,000. These with inquiries already out or expected from the Pennsylvania, Central of New Jersey, Southern Pacific and Louisville & Nashville make a total in prospect of 41,000, or 50 per cent more than all the cars bought last year.

New rail orders of the week have included about 30,000 tons taken by the Steel Corporation.

With fabricated steel lettings totaling fully 37,000 tons, taking in only projects of size, the past week and the week preceding (with a total of 40,000 tons) both indicate bookings by the bridge and structural shops of the country at a rate of over 100 per cent of capacity.

An advance of $3 per ton in black and galvanized sheets has been made by a large independent producer and followed by some others, but definite action by the American Sheet & Tin Plate Co. is still awaited. In many cases quotations at the old level hold good until April 1.

Wire rods have been advanced $2 to $38 per ton by the leading producer and there is some independent following in the new price. Wire and wire nail demand has broadened throughout the month and the situation as to prices is much stronger.

A reduction in New York warehouse prices on rolled steel indicates an effort to establish a spread of $12 per ton between mill and store deliveries compared with $15 lately regarded as the proper difference.

March orders in the export trade show an improvement, the rate being over 40 per cent of the average for 1920, which was 413,000 tons per month. A 6000 ton rail inquiry for Japan is pending.

Radiator companies have been conspicuous again as buyers of pig iron, one company having placed 10,000 tons at Chicago for Western plants, with a substantial concession in price made on 6500 tons. At Pittsburgh apparently the last basic available at $18 has been purchased.

Pittsburgh

PITTSBURGH, March 28.

The trend of prices still is upward, the past week having brought out announcements of advances in black and galvanized sheets by a large independent producer, which has been followed by about a dozen other independent makers; a return to a base of 1.90c., Pittsburgh, for hot-rolled flats, 3/16 in. and lighter, while yesterday a large independent made advance of $2 per ton in wire rods, this change being adopted by the wire making subsidiary of the Steel Corporation, and presumably will be followed by other makers.

Establishing 1.50c., Pittsburgh, except on small and unimportant tonnages of plates, shapes and bars, appears to be somewhat hampered by the failure of the Steel Corporation to make a definite statement as to its policy and the belief is common that there will hardly be a general adoption of the advance of $3 per ton on black and galvanized sheets pending adoption by the American Sheet & Tin Plate Co. It cannot be disputed that the undertone of the market is stronger than it has been at any time since early 1920. Order books of both the Steel Corporation subsidiaries and the independents in this and nearby districts are well filled and there is at least a month's business in practically all lines at to-day's rate of operations. So long as this condition is maintained recurrence of the low price which recently prevailed is not expected. There seems to be no method of reducing costs, save by a cut in wages, and this is considered to be out of the ques-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 28, 1922	Mar. 21, 1922	Feb. 28, 1922	Mar. 29, 1921
No. 2X, Philadelphia‡	$21.26	$21.26	$20.34	$27.26
No. 2, Valley furnace†	19.00	19.00	19.00	25.00
No. 2, Southern, Cin'ti†	19.50	19.50	20.00	29.50
No. 2, Birmingham, Ala.†	15.00	15.00	15.50	25.00
No. 2 foundry, Chicago*	20.00	20.00	19.50	25.00
Basic, del'd, eastern Pa.	*20.25*	20.50	19.84	25.00
Basic, Valley furnace	18.00	18.00	17.75	23.00
Valley Bessemer, del. P'gh	21.46	21.46	21.46	26.96
Malleable, Chicago*	20.00	20.00	20.00	25.00
Malleable, Valley	19.00	19.00	19.00	25.00
Gray forge, Pittsburgh	20.71	20.71	20.71	25.96
L. S. charcoal, Chicago	26.00	26.00	26.00	38.50
Ferromanganese, seaboard	62.50	62.50	62.50	90.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	28.00	28.00	28.00	38.00
O.-h. billets, Pittsburgh	28.00	28.00	28.00	38.50
O.-h. sheet bars, P'gh	29.00	29.00	29.00	38.00
Forging billets, base, P'gh	32.00	32.00	32.00	43.50
O.-h. billets, Philadelphia	*35.24*	33.74	33.74	44.24
Wire rods, Pittsburgh	36.00	36.00	36.00	52.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.40	1.40	1.40	2.25
Light rails at mill	1.40	1.40	1.40	2.35

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.76	1.76	1.76	2.45
Iron bars, Chicago	1.60	1.60	1.55	2.60
Steel bars, Pittsburgh	1.40	1.40	1.35	2.00
Steel bars, Chicago	1.60	1.60	1.50	2.38
Steel bars, New York	1.78	1.78	1.73	2.38
Tank plates, Pittsburgh	1.40	1.40	1.35	2.00
Tank plates, Chicago	1.60	1.60	1.50	2.38
Tank plates, New York	1.78	1.78	1.73	2.38
Beams, Pittsburgh	1.40	1.40	1.35	2.00
Beams, Chicago	1.60	1.60	1.50	2.38
Beams, New York	1.78	1.78	1.73	2.38
Steel hoops, Pittsburgh	1.80	1.80	1.80	2.80

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Mar. 28, 1922 Cents	Mar. 21, 1922 Cents	Feb. 28, 1922 Cents	Mar. 29, 1921 Cents
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	3.85
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.00
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.00
Wire nails, Pittsburgh	2.40	2.40	2.40	3.00
Plain wire, Pittsburgh	2.25	2.25	2.25	3.00
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.85
Tin plate, 100-lb. box, P'gh	$4.60	$4.60	$4.60	$7.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	$17.00	$17.00	$15.00	$14.00
Carwheels, Philadelphia	*15.75*	16.00	15.00	18.00
Heavy steel scrap, P'gh	**15.50**	15.00	15.00	13.00
Heavy steel scrap, Phila.	13.50	13.50	12.00	12.50
Heavy steel scrap, Ch'go	**12.75**	12.50	11.50	11.00
No. 1 cast, Pittsburgh	**16.50**	15.75	16.00	20.00
No. 1 cast, Philadelphia	*17.00*	17.25	16.50	18.00
No. 1 cast, Ch'go (net ton)	14.25	14.25	13.50	13.50
No. 1 RR. wrot, Phila.	15.50	15.50	15.00	17.00
No. 1 RR. wrot, Ch'go (net)	11.75	11.75	10.75	10.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.25	$4.00
Foundry coke, prompt	4.25	4.25	4.25	5.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*12.87½*	13.00	12.75	13.00
Electrolytic copper, refinery	*12.62½*	12.75	12.50	12.62½
Zinc, St. Louis	*4.65*	4.72½	4.55	4.65
Zinc, New York	*5.00*	5.07½	4.90	5.15
Lead, St. Louis	4.42½	4.42½	4.40	4.00
Lead, New York	4.70	4.70	4.70	4.25
Tin (Straits), New York	**29.25**	29.12½	29.75	29.25
Antimony (Asiatic), N. Y.	**4.35**	4.20	4.35	5.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, March 28, 1922, Finished Steel, 2.019c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel

Mar. 21, 1922,	2.019c.
Feb. 28, 1922,	1.998c.
Mar. 29, 1921,	2.743c.
10-year pre-war average,	1.689c.

Composite Price, March 28, 1922, Pig Iron, $18.38 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Mar. 21, 1922,	$18.38
Feb. 28, 1922,	18.10
Mar. 29, 1921,	24.38
10-year pre-war average,	15.72

tion on to-day's living costs. Assistance in cutting production costs through lower freight and fuel charges is considered so remote at the moment as to be without much influence.

Although not quotably higher, the pig iron market shows a definitely stronger tendency, especially in the steel making grades, supplies of which no longer appear to be burdensome, but on the contrary are a little short. This condition is the result of a larger melt on the one hand, and on the other hand the fact that some of the steel companies cannot put on idle furnaces with a strike of the union coal miners pending. The use of scrap has increased because of the light supplies of pig iron. The fuel market has shown a rather soft tone, but higher prices are expected soon after April 1, it being expected that the East will seek a good deal of Connellsville coke to take the place of anthracite coal, which will be cut off by the strike, and it is reckoned that if coke prices advance a rise in non-union coal cannot be avoided.

Pig Iron.—What is believed to be the last of the supplies of basic iron available at $18 was sold to-day. This lot, amounting to 1500 tons, was sold to a Pittsburgh district sheet maker at $18, Valley furnace. A careful check up on available supplies discloses that none now is to be had at $18, and the next sale is likely to be at 25c., and possibly 50c. per ton higher. The market for Bessemer iron also is stiffer, and on three sales, aggregating 1600 tons, it was not necessary for makers to shade $19.50, Valley furnace. There is a really good demand for foundry iron and some makers now report their shipments to be exceeding production. The largest piece of business closed in the past week was of approximately 3000 tons, of No. 2, No. 2X and No. 3, to the Westinghouse Electric & Mfg. Co., about equally divided between its Trafford, Pa., and Cleveland plants, with a small tonnage for Springfield, Mass. This interest was not able to do better than $19, furnace, for the base grade for Trafford and Cleveland, and paid $19.50, Valley furnace, for a portion of the tonnage. We note a sale of 500 tons of malleable iron at $19. The Republic Iron & Steel Co. advises this

office that, effective to-day, it has advanced its price on Southern iron to $16, Birmingham, for No. 2 foundry.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00
Bessemer	19.50
Gray forge	18.75
No. 2 foundry	19.00
No. 3 foundry	18.75
Malleable	19.00

Ferroalloys.—Most activity seems to center in spiegeleisen. A Youngstown district steel maker has put out an inquiry for 1000 tons of 20 per cent material for delivery at the rate of 200 tons a month, beginning June 1, and there is also an inquiry for 500 tons from a Canton, Ohio, steel maker for second-quarter delivery. Makers also are figuring against the requirements of another central Ohio steel company, although this interest has not put out a definite inquiry. An effort is being made to maintain the market at from $27.50 to $30 furnace, for 20 per cent material, and $1 per ton less for material of 16 to 19 per cent manganese content, according to the tonnage involved. These prices are somewhat above buyers' ideas, some of the latter claiming that $25 furnace is a fair price on 20 per cent material. Small lot tonnages of ferromanganese are being moved and in all cases at the full price of $62.50 Atlantic seaboard for either domestic or British product. The report persists that there will be an advance shortly to $65, Atlantic seaboard, for both kinds, but no definite developments yet are noted. There is no special activity in 50 per cent ferrosilicon, the price of which, based on latest sales, still is $55 furnace, freight allowed. There are reports that Jackson, Ohio, makers of Bessemer ferrosilicon and silvery iron, as of April 1, will advance price $2 per ton.

We quote 78 to 82 per cent ferromanganese, $62.50 c.i.f. Atlantic seaboard for domestic and English. Average 20 per cent spiegeleisen, $27.50 to $30 furnace; 16 to 19 per cent, $26.50 to $29 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson to New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—All makers of sheet bars now are quoting $31 Pittsburgh or Youngstown, and while this price as yet does not find much basis in sales, a number of producers are short of open-hearth steel and on new business are not disposed to shade that price. There has been some irregularity in the advance in slabs and large billets. Some makers are quoting slabs at $30.50, while others are at $30, and large billets are quoted at $21.50 by some and $30 by others. These prices have not been fairly established by sales.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2-in. billets, $29 to $31; Bessemer and open-hearth sheet bars, $29 to $31; slabs, $28 to $30; forging billets, ordinary carbons, $32 to $37, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Effective March 27, the Pittsburgh Steel Co. advanced the price of rods $2 per ton to $38 for the base size of soft rods. The American Steel & Wire Co. took like action to-day and other makers are expected to adopt the change. This development is the result partly of a considerably increased demand, due to improvement in business in finished products, but also because of the higher prices recently announced for billets, sheet bars and slabs. It is pointed out that at $36 per gross ton or $32.14 per net ton, large billets at $30 and plain wire at $45 per net ton were not a proper alignment. The new price on rods as yet is a quotation only and most recent sales have been at $36. Prices are given on page 895.

Wire Products.—As compared with the period from 1916 to 1920 inclusive, current business makes a rather poor showing, but contrasted with the several years prior to 1916, to-day's activities show up very favorably. On the whole, the trade is rather well satisfied and there is more real confidence in the immediate future on the part of both manufacturers and buyers than has been noted before in two years.

We quote wire nails at $2.40 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.25 base per 100 lb., Pittsburgh.

Steel Skelp.—Makers generally are now asking 1.50c. for steel pipe skelp, but as far as sales are concerned the market still is more properly quoted at 1.40c. to 1.45c.

Steel Rails.—Competition for orders for light rails seems to have decreased considerably in the past few weeks, and an effort now is being made by mills rolling these rails from new billets to obtain 1.50c. base. This price is not being done yet, but at least it is stimulating specifications on tonnages carrying lower prices. Pressure to sell these sections, rolled from old rails, also is lighter and prices are somewhat firmer.

We quote 25 to 45-lb. sections, rolled from new steel, 1.40c. to 1.50c. base; rolled from old rails, 1.35c. to 1.40c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Pipe.—Cutting of prices on merchant steel pipe to a very large degrees has disappeared and the possibility of a new card quoting lower prices also seems to have vanished. Business is gaining very steadily, but the stiffening in prices seems to be more in sympathy with the advance in plates, shapes and bars than because of the size of the demand. So long as the heavy tonnage products were so far out of line with pipe prices, buyers lacked confidence in the stability of the market and were inclined to keep down purchases to actual needs. There is no unusual activity in oil country goods, but here, as with merchant pipe, the approach of spring is reflected in an increase in the number of orders from oil field jobbers. It is reported that 98 miles of light wall 12-in. gas line for Louisiana previously referred to will be rolled by a Youngstown maker.

Spikes and Track Bolts.—No large inquiries are coming out for standard spikes, but there is a pretty steady flow of business in small lots to makers in this district. On single carloads the going quotation is $2.10 base per 100-lb., but large lots can be placed at $2 flat, f.o.b. Pittsburgh, this price having been named against the recent inquiry of the New York Central Railroad. That railroad also received bids on track bolts of considerably less than $3 base per 100-lb., which is the quotation of makers for carloads of a size. As low as $2.37, Pittsburgh, was quoted on that inquiry, but this is regarded as a special price on a special piece of business and is not regarded as a regular quotation. Prices are given on page 895.

Rivets.—Business still is looking up with makers in this district, but the buying has not yet reached proportions that permit of any advance in prices. Leading makers are not accepting contracts for heavy rivets at less than $2.10 for structural and $2.20 for boiler rivets. It is admitted, however, that less is being done on current orders for quick shipment. The bulk of the business in light rivets is on the basis of 75 and 10 per cent off list. Prices and discounts are given on page 895.

Iron and Steel Bars.—Makers in this and nearby districts secured a very good volume of orders of steel bars prior to the recent advance and are not showing much interest in new business unless the inquiry happens to be for a good sized tonnage, at less than 1.50c., Pittsburgh. Small lots have been placed at that price, but 1.40c. has been done within the past week on one sale involving more than 5000 tons. Reinforcing bars rolled from new steel also are held at 1.50c., but that price also refers to small lots. Makers of iron bars still are holding to the minimum of 2c. for refined iron in carload lots.

We quote steel bars rolled from billets at 1.40c. to 1.50c.; reinforcing bars, rolled from billets, 1.40c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.30c. to 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Tin Plate.—There is no let up in the requirements of the container manufacturers and some, indeed, are finding that their supplies are not sufficient to meet demands, this being evident in some rather good-sized sales lately of stock tin plate. Supplies of the latter with all makers are now very limited and are commanding better prices than recently could have been obtained. Price cutting has largely disappeared on production tonnages, and the market may now be well described as firm. Mill operations are high, the American Sheet & Tin Plate Co. having further increased the number of active units. This week's schedule calls for about 78 per cent of capacity, with the Cambridge,

Chester and Pennsylvania works all running 100 per cent. Outside of the Wheeling Steel Corporation, there is practically full occupation of independent tin plate capacity and this condition is assured by live specifications for several weeks.

We quote standard production coke tin plate, $4.60 per base box f.o.b. Pittsburgh for carload lots.

Fluorspar.—Kentucky and Illinois producers still are quoting material, 80 per cent calcium chloride and not over 60 per cent silica at $16, f.o.b. mines. This price is above the ideas of most consumers who are inclined to look for lower prices, especially in view of the fact that foreign material is being offered at a price equivalent to about $14 southern Illinois.

Nuts and Bolts.—While there has been no stiffening in prices, there has been an improvement in business and advances are predicted once the bar market becomes fully established at to-day's asking price of 1.50c. base, Pittsburgh. Buyers are not anticipating their wants, but orders are more numerous and come from widely scattered sources. Discounts are given on page 895.

Structural Material.—Fabricating interests in this district are not getting very many jobs which individually amount to 100 tons or more. The American Bridge Co. has taken 400 tons of high tension transmission towers for the Alabama Power Co. The Jones & Laughlin Steel Co. has taken 100 tons for a new junior high school, Monessen, Pa., 100 tons for automobile repair cribs and a number of small jobs involving a total of about 200 tons. The Federal engineers, Pittsburgh district, will open bids, April 21, for three steel barges. J. E. Greiner & Co., Pittsburgh and Baltimore, are acting as consulting engineers for the recently organized Tri-State Bridge Co., Bellaire, Ohio, which is planning the construction of a bridge across the Ohio River, between Bellaire and Benwood, W. Va. Mills have a fair amount of business on their books in plain material, but new demands are not especially large as far as this district is concerned. The market still is quotable at 1.40c., Pittsburgh, for large tonnages, and 1.45c. to 1.50c. on lesser lots. Prices are given on page 895.

Cotton Ties.—Suggestions of low-priced British competition are viewed by makers in this district with only academic interest. The opening of the season is about three months off and little, if any, thought yet has been given probable prices. The present basis of hoop mill products of 3/16-in. and lighter, providing the usual differential of 30c. per 100-lb. is maintained, would mean a price of 2.30c. per 100-lb., Pittsburgh, or $1.03½ per bundle of 45-lb. But there is no way of telling now where prices of hoops, bands, etc., will be at the opening of the tie season and there is no disposition now to figure tie prices. It is admitted that if British makers contract to deliver ties at $42 a net ton at Gulf ports, they would make serious inroads upon the business of domestic makers, but it also is stated that it will take a big discount from domestic prices by foreign makers to win the trade because of the better and more assured deliveries of domestic makers, while in the event of disputes, the latter can be more promptly reached. Domestic makers are not alarmed.

Hoops and Bands.—There has been a practically complete disappearance of quotations of less than 1.90c. base, Pittsburgh, on hoop mill products 3/16-in. and lighter. Some makers even are refusing to name less on the heavier gages. The bulk of the tonnage now on makers' books for hoops, however, carries a price around 1.80c. base, and on bands about 1.75c. base. Business generally is better, but hardly good.

Hot-rolled and Cold-rolled Strips.—There has been a very definite movement away from the recent low prices on hot-rolled strips, most makers of which now are asking 1.90c. base, Pittsburgh, and refusing new business at lower prices. Prices below that figure meant rather big losses for most makers, and an advance also is made necessary by the advance recently announced in billets. Business is still gaining in hot-rolled strips and also shows well-sustained improvement in cold-rolled. The latter is firm at 3.50c. base, Pittsburgh.

Cold-Finished Steel Bars and Shafting.—Business still is improving both as regards the number and size of the orders, but it cannot yet be said that prices are any stronger except that 1.80c. base is more really a minimum than it was recently. On small tonnages 1.90c. is being asked and obtained, but the going price on sizable orders usually is 1.80c. Ground shafting does not change, still being quoted at 2.25c. base, mill, for carload lots.

Plates.—This product has shared least of any in the recent betterment in business, and while most makers are unwilling to consider less than 1.50c. on new inquiries, sales at that price are difficult except on small tonnages which may be urgently needed.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.40c. to 1.50c., f.o.b. Pittsburgh.

Sheets.—The Wheeling Steel Corporation, under date March 22, announced an advance of $3 per ton on black and galvanized sheets, and automobile body sheets, effective April 1. Black electrical sheets are not affected by this change. Several other independent producers also will advance prices $3 per ton April 1, in line with the Wheeling advance, but the American Sheet & Tin Plate Co. gives no indication of its probable course in the matter of a price advance, other than is contained in Judge Gary's most recent announcement that the corporation would go along with the independent companies in a conservative way. Some of the independent companies are waiting for the American Sheet & Tin Plate Co. to take a position before falling in line with the Wheeling advance. The companies which will go to 3.15c. base and 4.15c. base, respectively, for black and galvanized sheets on April 1 are giving their customers full opportunity to place tonnages at to-day's prices, and this gives these buyers an advantage over the customers of those companies which have not yet acted, in case the latter later decide to make the advance.

Coke and Coal.—The effect of the impending coal strike upon the market is negligible, activity being absent and prices showing no marked strength. On standard furnace coke for prompt delivery, the common asking price is $3.50 per net ton oven, but it is a fact that fairly good coke has been sold recently at $3.25. On spot foundry grade the market remains quotable at $4.25 to $4.50 per net ton oven, but for second quarter contracts the going quotation is $4.75. There are intimations of unrest among the men in the Connellsville and other non-union fields and suggestions that it may be difficult to keep up non-union production of coal when the union mines suspend, but such reports are not taken very seriously.

Old Material.—The market again is showing marked strength on the steel works grades because of a revival of buying by Valley mills, and also by Pittsburgh district independents. The increase in business in finished lines has developed something of a shortage of pig iron and because it is regarded as impractical to start up idle blast furnaces in view of the impending strike of the union coal miners, there is naturally a strong demand for scrap.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$15.50 to $16.00
No. 1 cast, cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.00 to 15.50
Compressed sheet steel	13.50 to 14.00
Bundled sheets, sides and ends	12.50 to 13.00
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	16.00 to 16.50
Low phosphorus standard bloom and billet ends	17.50 to 18.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.50 to 14.00
Iron car axles	23.00 to 24.00
Locomotive axles, steel	21.00 to 22.00
Steel car axles	16.00 to 16.50
Cast iron wheels	15.50 to 16.00
Rolled steel wheels	16.00 to 16.50
Machine shop turnings	11.00 to 11.50
Sheet bar crop ends	15.50 to 16.25
Heavy steel axle turnings	13.00 to 13.50
Short shoveling turnings	12.50 to 13.00
Heavy breakable cast	15.50 to 16.00
Stove plate	13.00 to 13.50
Cast iron borings	12.50 to 13.00
No. 1 railroad wrought	12.50 to 13.00

Chicago

CHICAGO, March 28.

The approach of the threatened coal strike appears to have had little effect on the market. Local steel producers report that they have been unable to discover a single buyer who gives the strike as his reason for placing business. Perhaps the principal evidence of caution is to be found among the producers themselves, who hesitate to blow in additional blast furnaces until it becomes clear just what the effects of the strike will be. This is not that they fear curtailment of their own operations, for, on the contrary, they are well stocked with fuel, but they are not certain their customers are equally well supplied. Generally speaking, however, the impending walkout of the miners has created a minimum of disturbance in the market, and little interference with industrial operations is expected unless the strike is protracted. One of the best indications that the strike is being ignored is the fact that buying of both iron and steel is continuing at an undiminished rate, despite the fact that deliveries cannot be made until after April 1. This is particularly true of steel bars, plates and shapes on which local mills are unable to promise shipment inside of 60 or 90 days unless the sizes desired happen to fit into existing rolling schedules.

Mill operations show little change. The Illinois Steel Co. has 15 active blast furnaces, while its steel output at 70 per cent of ingot capacity is slightly better than a week ago. The Inland Steel Co. remains on a 60 per cent basis.

Pig Iron.—The American Radiator Co. has closed for 10,000 tons of No. 1 foundry for its western plants. For Bremen, Ind., 3500 tons was placed with a Toledo furnace, while for Litchfield, Ill., and Kansas City, 6500 tons went to a Chicago producer at a reported price of $18.60, furnace. This concession in price is not regarded as of any regular significance, as the business was taken in competitive territory. In what is considered as the Chicago district, local iron appears firm at $20 base furnace. In general, the market shows no material changes. Shipments from local furnaces are slowly increasing, now being about equal to production, but there is nothing in the situation to indicate that there will be any sharp deviation from the gradual but steady progress toward industrial recovery which has been under way for some time. Current orders are largely for small lots. Ranging from a carload up to 400 or 500 tons. Southern iron is being sold more freely in this market from week to week, business being taken both by furnaces shipping all rail and by the producer delivering by the water and rail route. A sale of 500 tons of Southern foundry for central Michigan delivery has been made at $15 base, Birmingham. A local melter has placed an order for 500 tons of Southern foundry for delivery by barge and rail at a price of $20.27, Chicago. This is about 40c. below the delivered price of local foundry. A number of smaller sales have been made by the same producer for delivery in Chicago and contiguous territory. The largest new inquiry reported comes from the Manufacturers' Foundry Co., Milwaukee, and calls for 2000 tons of No. 2 foundry. A Lansing, Mich., melter has bought 200 tons of 8 per cent silvery at the Jackson County schedule and another Michigan foundry wants 100 tons of 7 per cent.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$26.00
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos	20.00
Southern foundry, sil. 1.75 to 2.25	$20.27 to 21.67
Malleable, not over 2.25 sil	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	30.00
Silvery, sil. 8 per cent	32.82

Ferroalloys.—A large local consumer has closed for 300 tons of ferromanganese at $62.50, tidewater, and another melter has bought 250 tons, it is said, at the same price. It is generally expected that a duty will be placed on ferromanganese and this will probably result in an advance in price. According to latest reports, the duty will be about $4.50 a ton. The other ferroalloys are quiet.

We quote 78 to 82 per cent ferromanganese, $70.90, delivered; 50 per cent ferrosilicon, $56 to $57.50, delivered; spiegeleisen, 16 to 18 per cent, $40.10, delivered.

Railroad Equipment.—Bids opened by the Chicago & Northwestern on 2600 freight cars showed a wide variation in prices. On the 1250 box cars, the bids ranged from $1,864.50 to $1,900.90; on the 500 flat cars, from $1,388 to $1,475; on the 300 refrigerator cars, from $2,727 to $2,875; on the 300 stock cars, from $1,598 to $1,675; on the 250 gondola cars, from $1,645 to $1,791. The cars have not yet been placed, but the low bidders are as follows: On the box cars, Illinois Car Mfg. Co.; on the flat and stock cars, General American Car Co.; on the refrigerator cars, the American Car & Foundry Co.; on the gondola cars, the Keith Railway Equipment Co. The Chicago, Milwaukee & St. Paul has placed orders for cars as follows: 1500 box cars to the Bettendorf Co., 1000 each to the Western Steel Car & Foundry Co. and the Pullman Co., and 500 automobile cars with the General American Car Co. This road still has 1000 refrigerator cars to place and the Northern Pacific wants a like number of refrigerator cars with the likelihood that it will close for them this week. The Norfolk & Western has ordered 4000 steel hopper cars, 2000 with the Pressed Steel Car Co. and 1000 each with the American Car & Foundry Co. and the Standard Steel Car Co. The Southern Pacific is inquiring for 1000 automobile cars, the Louisville & Nashville for 500 all-steel hopper cars and 500 to 1000 composite gondola cars, and the Chesapeake & Ohio for 1500 to 4000 coal car bodies. Other inquiries include the Elgin, Joliet & Eastern, 300 underframes and 200 bodies for side dump coal cars; the Monon, superstructures and underframes for 100 gondola cars; the Chicago, West Pullman & Southern, 20 hopper bodies; the Missouri, Kansas & Texas, 30 steel coaches; the Cotton Belt, eight coaches and six chair cars. The American Refrigerator Transit Co. contemplates the purchase of 2000 refrigerator cars while the Missouri Pacific is inquiring for repairs on 200. The New York Central is in the market for 50 and the Louisville & Nashville for four 8-wheel switch engines, while the Southern is inquiring for 10 Mikado type engines. The Chicago & Northwestern is expected to enter the market for 50 locomotives and the Lehigh & New England is about to close for new power. Inquiry for cars and locomotives is active nothwithstanding the stiffening tendency of steel prices. Western car builders who until recently were able to place plates, shapes and bars at 1.40c., Chicago, and less, now find that they cannot buy for less than 1.50c., or about $2 below the general market.

Cast-Iron Pipe.—Business shows no signs of falling off and sellers see nothing ahead which will interfere with their trade unless it be the passage of the soldiers' bonus bill. Should the funds for the bonus be raised by the flotation of bonds, the sale of municipal bonds might be rendered difficult. The National Cast Iron Pipe Co. has been awarded 260 tons for Fort Dodge, Iowa, and is low bidder on 1000 tons for Duluth. The United States Cast Iron Pipe & Foundry Co. will furnish 530 tons for Park Ridge, Ill. Youngstown, Ohio, will take bids on 500 tons March 31 and Spring Green, Wis., will receive tenders on 175 tons April 14. Hermosillo, Sonora, Mexico, is in the market for 500 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $46.10 to $47.10; 6-in. and above, $42.10 to $43.10; class A and gas pipe, $3 extra.

Bars.—Demand for mild steel bars is active with all local mills operating double turn. New orders are for 60 to 90 days' delivery unless the sizes called for happen to fit in with existing rolling schedules. Both consumers and jobbers are making an effort to build up their depleted stocks, and even the farm implement manufacturers are buying in moderate tonnages to fill out broken assortments. Bar iron mills find business improved, although buying is not yet on the scale at

which steel bars are being purchased. Hard steel bars appear to be firm at 1.50c., mill, with bookings sufficient to permit the mills to operate single turn.

Mill prices are: Mild steel bars, 1.60c., Chicago; common bar iron, 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago.

Jobbers quote 2.28c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.15c. for rounds and 3.65c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 1.90c. base. Deformed bars, 1.75c. to 2c. Hoops, 3.13c. Bands, 2.88c.

Warehouse Prices.—Local jobbers have reduced cold-rolled steel bars and shafting 25c. per 100 lb.

Sheets.—The $3 advance on black and galvanized announced by the Wheeling Steel Products Co. as effective April 1, has not been followed by local producers nor has it yet been generally adopted by Eastern mills. While there is no denying that the sheet situation is strong, demand is of an uneven character, black sheets being sought after much more actively than galvanized.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Wire Products.—Buying is brisk and it is notable that rush shipment is asked for on a large majority of current orders. Both jobbers and manufacturers are active in the market. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 895.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $2.85 per 100 lb.; No. 9 and heavier bright basic wire, $3 per 100 lb.; common wire nails, $3 per 100 lb.; cement coated nails, $2.50 per keg.

Rails and Track Supplies.—Demand for track materials is undiminished, one local producer having booked a total of 15,000 tons of tie plates during the past week. This commodity is firmer at approximately $35, mill, while track spikes and bolts are still weak, as low as 1.90c., Pittsburgh, having been named on spikes. The Chesapeake & Ohio, which placed 7000 tons of rails with the Illinois Steel Co., as announced two weeks ago has also ordered 9500 tons from the Inland Steel Co. and 800 tons from the Bethlehem Steel Co. The Pere Marquette has ordered 1500 tons of rails from the Inland Steel Co. Light rails are relatively inactive with billet stock moving at 1.50c., mill, and rerolled material at a dollar or so less. The New York Central has exercised an option placing an additional 6000 tons of rails with the Illinois Steel Co.

Standard Bessemer and open hearth rails, $40; light rails rolled from new steel, 1.50c., f.o.b. makers' mills.

Standard railroad spikes, 1.90c. to 2c., Pittsburgh; track bolts with square nuts, 3c. to 3.05c., Pittsburgh; tie plates, steel and iron, 1.65c. to 1.75c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bolts and Nuts.—Demand is materially improved and most makers are now adhering rather firmly to the discounts on page 895, quoting f.o.b. mill on materials manufactured in the West and f.o.b. Pittsburgh on commodities largely made in the East.

Jobbers quote structural rivets, 3c.; boiler rivets, 3.10c.; machine bolts up to ¾ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ¾ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Plates.—Additional large car orders will further augment the tonnage on mill books. The 4000 cars just placed by the St. Paul will take 40,000 tons of steel including the axles. This business has been divided about evenly between the Illinois and Inland companies. Consumers now entering the market for plates, shapes, and bars, cannot count on delivery inside of 60 days unless the sizes desired happen to fit in with existing rolling schedules.

The mill quotation is 1.60c. Chicago. Jobbers quote 2.38c. for plates out of stock.

Structural Material.—Mill bookings continue to expand and fabricators likewise are enjoying better business. Locally the London Guarantee & Accident Co. building and the Methodist Church Temple, each involving more than 4000 tons, have been let, and an old contract for the Belden Hotel requiring 3200 tons, has been reinstated. Throughout the West, construction activity is increasing notwithstanding the fact that the wages of building craftsmen are regarded as excessive. Fabricating awards include:

London Guarantee & Accident Co. Building, Chicago, 4488 tons, to Morava Construction Co.

Methodist Episcopal Church Temple, Chicago, 4000 tons, to American Bridge Co.

Belden Hotel, Chicago, 3200 tons, to American Bridge Co.

Great Northern Railway, repairs to bridge, St. Cloud, Minn., and spans for grade separation at Minneapolis, 997 tons, to American Bridge Co.

Milwaukee sewage disposal plant, 426 tons, to McClintic-Marshall Co.

Margaret F. Campbell Office Building, Denver, 450 tons, to American Bridge Co.

Guerneville Bridge over Russian River in California, 305 tons, to American Bridge Co.

Public school, Traverse City, Mich., 300 tons, to Worden-Allen Co.

United Railways Co. of St. Louis, buildings in St. Louis, 176 tons, to Christopher & Simpson Iron Works.

State bridges, Little Marais, Minn., 164 tons, to Illinois Steel Bridge Co.

Callaway Fuel Co., Milwaukee, coal shed, 130 tons, to Milwaukee Structural Steel Co.

Pending business includes:

Bridge, Parker, Wash., for Union Pacific, 700 tons.

Great Northern Railway, 59 I-beam spans, 380 tons.

Snowden Building, Memphis, 1750 tons.

Theatre and office building, Fort Wayne, Ind., 450 tons.

The mill quotation on plain material is 1.60c., Chicago. Jobbers quote 2.38c. for plain material out of warehouse.

Reinforcing Bars.—An inquiry for 1600 tons of reinforcing bars for the University of Illinois stadium, Urbana, calls for delivery of one-half of the tonnage in the third quarter of this year and the remainder in the second quarter of 1923. Bids will be opened at Springfield, Ill., on March 31, on highway work involving about 2000 tons. For State road work in Arkansas, 350 tons is pending. The Concrete Engineering Co. will furnish 500 tons for the Central Life Insurance Building, Des Moines, Iowa, while the Corrugated Bar Co. has an order for 150 tons for the Illinois Central.

Steel Castings.—Notwithstanding heavy orders for cars, no additional castings business of consequence is reported placed. Some unevenness in castings prices has developed with the result that new discounts recognizing altered conditions in the market will be announced next week.

Old Material.—Consumptive buying has dropped sharply, this being particularly true of steel works and iron mill grades. For the time being, at least, the situation with respect to these grades and to a large extent all items, is to be regarded as a dealers' market. With the dealers bidding up prices through trades between themselves and purchases of railroad offerings, users are holding back in the hope that a reaction will set in. Sellers, on the other hand, are encouraged by the improvement in the finished steel business and are confident that the advances in scrap will hold.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$17.00 to	$17.50
Relaying rails	20.00 to	25.00
Cast iron car wheels	17.00 to	17.50
Rolled or forged steel car wheels	14.50 to	15.00
Steel rails, rerolling	14.00 to	14.50
Steel rails, less than 3 ft	13.75 to	14.25
Heavy melting steel	12.75 to	13.25
Frogs, switches and guards cut apart	12.75 to	13.25
Shoveling steel	12.50 to	13.00
Low phos., heavy melting steel	14.50 to	15.00
Drop forge flashings	8.50 to	9.00
Hydraulic compressed sheet	9.00 to	9.50
Axle turnings	9.00 to	9.50
	Per Net Ton	
Iron angles and splice bars	15.00 to	15.50
Steel angle bars	12.25 to	12.50
Iron arch bars and transoms	16.50 to	17.00
Iron car axles	20.00 to	20.50
Steel car axles	13.75 to	14.25
No. 1 busheling	9.50 to	10.00
No. 2 busheling	6.25 to	6.75
Cut forge	11.50 to	11.75
Pipes and flues	8.00 to	8.50
No. 1 railroad wrought	11.75 to	12.00
No. 2 railroad wrought	11.50 to	11.75
Steel knuckles and couplers	13.00 to	13.50
Coil springs	13.50 to	13.75
No. 1 machinery cast	14.25 to	14.75
No. 1 railroad cast	13.50 to	14.00
Low phos. punchings	11.50 to	12.00
Locomotive tires, smooth	11.00 to	11.50
Machine shop turnings	5.75 to	6.25
Cast borings	7.50 to	8.00
Stove plate	13.00 to	13.50
Grate bars	11.50 to	12.00
Brake shoes	11.50 to	12.00
Railroad malleable	13.00 to	13.50
Agricultural malleable	13.00 to	13.50

Philadelphia

PHILADELPHIA, March 28.

A marked change for the better in the steel business has developed within the past week or 10 days. Many of the steel companies have booked at least twice the volume of business in March that was taken in February. The intimation that Carnegie Steel Co. will follow the lead of independent companies in advancing plates, shapes and bars to 1.50c., Pittsburgh, has caused many steel consumers to hurry in their orders on outstanding quotations, on which protection had been given in most instances up to last Saturday. On some outstanding quotations protection has been given until April 1. Not much business has been booked at 1.50c., Pittsburgh, but there has been enough to encourage the steel companies, and before another week it appears that the market on the heavy tonnage products will be firmly established at that level.

Some of the independent sheet companies have announced an advance of $3 a ton, effective April 1, and many sheet consumers have likewise hastened to enter second quarter contracts at the existing prices, 2.25c. for blue annealed, 3c. for black and 4c. for galvanized, Pittsburgh.

The volume of business in prospect is considerable, especially in railroad and structural lines. Prospects of car and locomotive business from Eastern railroads, which up to date have not bought in as large a way as Western roads, are much more promising.

Pig Iron.—Basic pig iron is again in demand after a lull in buying which has lasted for many weeks. An Eastern steel plant has bought upward of 3000 tons at close to $20.25, delivered, and another steel company has bought 1000 tons at about the same figure. The latter purchaser is expected to buy more iron shortly. A Harrisburg consumer whose inquiry called for 3000 tons has not bought, but the business may be closed this week. A feature of the market is inquiry for basic iron from the Pacific Coast. A test of foundry iron prices was afforded by the purchase of 1500 tons by a Trenton, N. J., consumer at $21.26, delivered, for No. 2 plain, or $20, furnace. The business was divided among two or three furnaces. Sellers are now apparently unwilling to accept less than $20, furnace, for No. 2 plain and $20.50 for No. 2 X even on the most attractive tonnage. A fairly well sustained demand for foundry iron is in evidence and sales of the past week totaled probably 10,000 tons. There are no outstanding inquiries at the moment, but a larger number of melters are coming into the market, indicating a healthy expansion of business. Even in low phosphorus iron, which has been exceedingly quiet, there has been a little activity, one sale of 1500 tons of copper-bearing iron having been made at $28, furnace. Gray forge has been sold at about $20.50, delivered. The Midvale Steel & Ordnance Co. will blow in its No. 2 furnace at Coatesville about April 8 or 10. As the Coatesville plant now has only two active open-hearth furnaces, not all of the pig iron to be made will be required for the company's own use and basic and foundry grades will be offered for sale. The Bethlehem Steel Co., which has two furnaces on foundry iron, will put on a third furnace to take care of its merchant orders. The Alan Wood Iron & Steel Co. now has two of its three furnaces in blast.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76 to $20.84
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26 to 21.34
Virginia No. 2 plain, 1.75 to 2.25 sil.	26.24 to 26.74
Virginia No. 2X, 2.25 to 2.75 sil.	27.24 to 27.74
Basic delivery eastern Pa.	20.25 to 20.50
Gray forge	20.50 to 21.00
Malleable	22.50 to 24.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Purchases of manganese ore are likely to be made by steel companies which ordinarily have not made their own ferromanganese if Congress places a duty on imported ferromanganese and none on the ore. A contract for manganese ore at 22c. per unit entered into about 60 days ago by a leading Pittsburgh steel company has not been carried out. The present market price on ore is about 25c. per unit, seaboard. Ferromanganese is firm at $62.50, seaboard, for both imported and domestic alloy.

Semi-Finished Steel.—Some of the steel companies have advanced prices on semi-finished steel to the following schedule: Open hearth or Bessemer rerolling billets, 4 x 4 in. and larger, $29.50, base; under 4 x 4 in., $31; slabs, $30.50; sheet bars, $31; forging billets, $34.50; wire rods, $38, all per gross ton, Pittsburgh. Not all of the makers have followed these advances, but those which have not done so say they probably will follow suit within a week or so.

Rails and Track Supplies.—Light rails are firm at 1.45c., Pittsburgh, and a fair volume of business is being booked. There is a good demand from Eastern railroads for track supplies, particularly spikes, current business including 1500 kegs for the Atlantic Coast Line, 2000 kegs for the Chesapeake & Ohio and 1000 kegs for the Seaboard Air Line, all of which has been closed or will be shortly.

Plates.—Eastern plate mills are booking some business at 1.50c., Pittsburgh, and the market is much stronger since the trade has received the intimation that the Carnegie Steel Co. will follow the lead of the independents in advancing to 1.50c. The bulk of the past week's business, however, has been booked at figures $2 or $3 a ton below 1.50c., as protection was given in many instances up to April 1. Railroad work appears particularly promising, as Eastern roads come into the market for rolling stock. The Philadelphia & Reading has placed 25 locomotives with the Baldwin Locomotive Works and that company last week booked 13 additional engines from scattered sources. The Reading locomotives will require about 500 tons of plates. Other locomotive orders are in prospect and considerable new car inquiry is expected soon. The Louisville & Nashville will open bids on 1000 freight cars next week. The Merchants' & Miners' Transportation Co. is getting bids on a boat which will require upwards of 1000 tons of steel. The Sun Shipbuilding Co. has placed plates, shapes and bars, totaling about 1500 tons, for two boats and several barges, and about 300 tons of boiler steel for marine boilers. Plate mill operations in the East are showing a slight gain. The Midvale plant at Coatesville has two open-hearth furnaces on and will roll some plate orders there, the mills having been idle most of the time for many months. We quote sheared and universal plates at 1.40c. to 1.50c., Pittsburgh, but the latter quotation applies on nearly all new inquiry.

Structural Steel.—Greater activity in structural steel work in the Philadelphia district is noted. A great deal of building is being figured on and steel requirements will come into the market shortly. The American Bridge Co. will furnish 7000 tons of fabricated steel for the Porter Street pier. Two other city piers, requiring a total of 7000 tons additional, are up for bids. The Levering & Garrigues Co. is reported to have been awarded the William Fox Building at Sixteenth and Market streets, 1500 tons. The United Gas Improvement Co., Philadelphia, will close bids on March 30 for a power plant at Norristown, requiring 1000 tons. Plain material is quoted at 1.50c., Pittsburgh, by all of the independents and the trade has been informed that the Carnegie Steel Co. will go to this figure, though no official announcement has been made. We quote plain material at 1.40c. to 1.50c., Pittsburgh. Much of the business which has been closed within the past week has been at or near the lower figure on protection given by the mills, which in most instances will expire April 1.

Bars.—Substantial bar orders have been placed within the past week, but only a small portion of the business has been booked at the new price of 1.50c., Pittsburgh, now quoted by the independents. The Carnegie Steel Co. has made no official price announcement, but has notified its trade that 1.50c. will be its price, and on some inquiries is reported to have actually quoted that figure. Buyers have hastened to get in their orders on outstanding quotations at the recent low figures, a marked gain in booked tonnage being

the result. Bar iron makers in the East are quoting 1.40c., Pittsburgh, and report a slight gain in orders. The advance in soft steel bars has not extended as yet to concrete reinforcing bars, which can be obtained at 1.40c. to 1.45c., Pittsburgh, depending on the size and character of the specification.

Sheets.—Several independent sheet companies have followed the lead of the Wheeling Steel Corporation in announcing an advance of $3 a ton on sheets, effective April 1. Meanwhile they are taking care of their trade on second quarter contracts at 2.25c. for blue annealed, 3c. for black and 4c. for galvanized, all base Pittsburgh. Not all of the sheet makers have decided to advance, but some of them are considering the matter and may do so within the next week. A good volume of new business is being booked and buyers now find it difficult if not impossible to get quotations lower than the above-mentioned figures. One buyer received 15 uniform quotations from that many makers, not one offering a concession of any kind. Tin plate quotations are more nearly uniform at $4.60 per base box, but $4.50 can still be done on sizable lots.

Bolts and Nuts.—The market on bolts and nuts is weak, but a considerable volume of business is being booked, especially from the jobbers, at price concessions. The nominal discount on large machine bolts is 70 and 10 per cent off list, but an additional 5 per cent is being granted in most cases. Second quarter contracts are being made on this basis.

Warehouse Business. — Local warehouses have changed prices on practically all items, and with the exception of a few slight changes upward, the whole list has been marked down. We now quote for local delivery as follows:

Soft steel bars and small shapes, 2.36c.; iron bars (except bands), 2.36c.; round edge iron, 2.55c.; round edge steel, iron finish, 1½ x ½ in., 2.55c.; round edge steel planished, 3.30c.; tank steel plates, ¼-in. and heavier, 2.46c.; tank steel plates, 3/16-in., 2.61c.; blue annealed steel sheets, No. 10 gage, 3.25c.; black sheets, No. 28 gage, 3.75c.; galvanized sheets, No. 28 gage, 4.75c.; square twisted and deformed steel bars, 2.36c.; structural shapes, 2.46c.; diamond pattern plates, ¼-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3c.; squares and hexagons, cold-rolled steel, 3.50c.; steel hoops, No. 13 gage and lighter, 3.11c.; steel bands, No. 12 gage to 3/16-in., inclusive, 2.86c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.

Old Material.—The scrap market continues firm with the exception of a slight weakness in cast iron car wheels and No. 1 cast scrap. On the latter one large pipe foundry has reduced its price to $17, delivered, and has got a fair tonnage at that figure. Steel scrap, bundled sheets and borings and turnings for blast furnace use, are strong, and the tendency is upward, though no actual change has occurred within the week. As high as $14, delivered Bethlehem, has been paid for No. 1 heavy melting steel. A Delaware steel plant is offering $13. The Cambria plant at Johnstown, which paid up to $15.25 and then dropped out of the market, is again a buyer and offering $14.75, delivered. Some scrap dealers are unwilling to sell below $14, delivered at Eastern Pennsylvania plants. We quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap rails	13.50 to 14.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	18.00 to 19.00
Cast iron car wheels	15.75 to 16.25
No. 1 railroad wrought	15.50 to 16.00
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	11.50 to 12.00
No. 1 busheling	12.50 to 13.50
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	11.00 to 11.25
Mixed borings and turnings (for blast furnace use)	11.00 to 11.25
Machine-shop turnings (for rolling mill and steel works use)	12.00 to 12.50
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	17.00 to 17.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	13.00 to 13.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Shafting	18.50 to 19.00

New York

NEW YORK, March 28.

Pig Iron.—Inquiries footing up a very fair tonnage are pending, but the orders placed have been small for the most part, although the Richmond Radiator Co., which was in the market for 1500 tons for one of its plants and 3000 tons for another, has purchased 1500 tons and is expected to buy 3000 more. The Thatcher Furnace Co., Newark, has been sounding the market for delivery over the remainder of the year at the rate of about 1000 to 1500 tons per quarter, but no furnace has yet expressed willingness to sell beyond the third quarter and it is doubtful whether anyone will name a price for the last quarter. The water rate from Buffalo to New York for the season beginning April 15 has been fixed at $2.75, while the rate to Bridgeport is $3.25 and rates to other points in New England vary in accordance with the distance. With the advantage of this water rate, Buffalo furnaces will be active competitors and may be able to obtain a somewhat higher price at the furnace, but sales are still being made on a basis of $18 to $18.25 for No. 2 plain at Buffalo furnace. The eastern Pennsylvania market is somewhat firmer and it is difficult to buy at less than $20 for No. 2 plain in small tonnages and $19.50 apparently is the lowest price available on large tonnages.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$23.02 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52 to 23.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.02 to 22.52
Buffalo, sil. 1.75 to 2.25	23.46 to 23.71
No. 2 Virginia, sil. 1.75 to 2.25	28.16

Ferroalloys.—Demand for ferromanganese is confined to carload and small lots, sales of both the British and American product being reported at current prices. The spiegeleisen market is fairly active and inquiries total 2000 tons for domestic consumption and 1000 tons for export. There have been no developments in the manganese ore market and quotations are nominally unchanged and firm. A fairly brisk business both for contract and immediate shipment is reported by sellers of 50 per cent ferrosilicon and, while quotations are unchanged, there are indications that the minimum price has a tendency to stiffen from $55 to $57, freight allowed. A good business is also reported in ferrochromium at current quotations, domestic makers getting the bulk of the business. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, seaboard, per ton	$62.50
Ferromanganese, British, seaboard, per ton	$62.50
Spiegeleisen, 16 to 19 per cent furnace, per ton	$29.00
Spiegeleisen, 20 per cent, furnace, per ton	$30.00
Ferrosilicon, 50 per cent, delivered, per ton	$55.00 to $60.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, domestic, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb Cr., delivered	13c.
Ferrovanadium, per lb. of contained vanadium	$4.00

Ores

Manganese ore, foreign, per unit, seaboard	25c. to 26c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$18.00 to $20.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$19.00 to $21.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c.

Finished Iron and Steel.—Railroad requirements continue to be one of the promising features of current demand for steel products. In view of the fact that comparatively little car business has been placed in the East, the order of the Norfolk & Western Railroad for 4000 70-ton steel hoppers stands out as a possible indication that the wave of car buying in the Chicago territory may be duplicated in this territory. The Chesapeake & Ohio Railroad will send out an inquiry shortly for 5250 freight cars of various types, and it is reported that the Pennsylvania Railroad is considering the purchase of 10,000 cars, the New York Central Lines of 15,000 to 17,000 cars, and the Central Railroad of New Jersey of 2000 to 4000, but official confirmation of the last three items is lacking. The order of the Norfolk & Western was divided as follows: Pressed Steel Car Co., 2000; American Car & Foundry Co., 1000, and the Standard Steel Car Co.,

1000. Each car requires 15 tons of plates, shapes and bars, 2 tons of axles and 3 tons of wheels, a total of 80,000 tons of steel for the 4000 cars. The St. Paul order was divided as follows: Western Steel Car & Foundry Co., 1000 box; Pullman Co., 1000 box; Bettendorf Co., 1500 box, and General American Car Co., 500 automobile cars. Each car takes about eight tons of plates, shapes, bars and axles, or a total of 32,000 tons of steel. The New York Central Railroad opened bids on Wednesday, March 22, for its second quarter requirements, which include up to 3000 tons of plates, shapes and bars, and varying quantities of tires, axles, seamless tubes, track supplies, sheets, etc. A complete tabulation of the bids is published elsewhere in this issue. The Carnegie Steel Co. has reduced the spread between mill and warehouse prices by $3, its local warehouse prices now being $12 a ton above the mill prices, figuring 1.40c. Pittsburgh for the heavy tonnage products. The steel market, so far as new business is concerned, is fast reaching 1.50c., Pittsburgh, on plates, shapes and bars, only occasional concessions of $1 a ton, particularly on plates, being noted on desirable orders. New railroad car work is being figured on the basis of 1.45c. for plates. On 2100 tons of plates for 66 oil tanks placed with an independent mill by the Standard Oil Co. of New Jersey, the base price was 1.50c., Pittsburgh, but extras were cut considerably, a substantial portion of the tonnage being flanged and dished heads. Sheet prices have stiffened as the result of the announcement by the Wheeling Steel Products Co. of an advance of $3 a ton. Other makers may take similar action. Tin plate is firmer and $4.60 per base box, Pittsburgh, appears to be the minimum, whereas $4.50 was recently the bottom. The New York Central Railroad, which late in 1921 allocated 125,000 tons of rails for 1922 shipment, has exercised at least some of its options for taking 20 per cent additional. A reflection of the recent marked improvement in operations of automobile plants has come to Eastern mills in the form of larger and more frequent orders for alloy steels, for which there had been little demand in some time. The booking of steel business in the past week has proceeded at a good rate. While the aggregate of plates, shapes and bars entered at 1.50c., Pittsburgh, is not large, it remains that 1.40c. has practically disappeared and signs point, partly through the changed attitude of buyers, to 1.50c. and even higher in the immediate future. Structural work is in fair volume, new work that has been let including the following:

Public Ledger Building, Philadelphia, 2700 tons, to American Bridge Co.

Loft, Broadway and Thirty-seventh Street, New York, 2200 tons, to George A. Just Co.

Loft for Julius Tisch, 1100 tons, to Hinkle Iron Co.

Building for Interzone Corporation, New York, 700 tons, to Hedden Iron Construction Co.

Public School No. 67, Brooklyn, 750 tons, to George A. Just Co.

Faculty House, Columbia University, 300 tons, to Harris Structural Co.

Subway extension in Forty-second Street, New York, 3100 tons, to American Bridge Co. (This tonnage was tentatively awarded some months ago, but has just been released through awarding of the general subway contract by New York.)

Two piers, Philadelphia, 7000 tons, this being in addition to the Porter Street pier, Philadelphia, reported awarded to American Bridge Co.

Work on which figures have been requested is as follows:

Two bridges for the Lehigh Valley Railroad, 350 tons, this being in addition to another 350 tons, on which bids have just been taken.

City of New York, subway extension in Brooklyn, 700 tons, bids closing April 3, and Lawrence Street station, Brooklyn, 600 tons, on which bids closed to-day (March 28).

The Boston Elevated Railway Co. will fabricate 600 tons of steel for car inspection sheds in its own shops owing to the inability of any bidder to guarantee that the material would be fabricated in a "closed" shop.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.78c. to 1.88c.; plates, 1.78c. to 1.88c.; structural shapes, 1.78c. to 1.88c.; bar iron, 1.78c. On export shipments the freight rate is 28.5c. per 100 lb. and the domestic rate is 38c.

Warehouse Business.—Prices have generally dropped off $3 per ton, following the action of the leading warehouse interest in bringing bars and structural material down to 2.38c. and 2.48c. per lb. respectively. This places current warehouse quotations on a $12 per ton margin with mill prices based on a Pittsburgh price of 1.40c. per lb. and a $10 margin with the Pittsburgh price at 1.50c. per lb. Although the leading interest reduced hoops to 3.28c. per lb. and bands to 2.88c. per lb., other warehouses are generally continuing to quote 3.38c. and 2.98c. This condition also prevails in blue annealed sheets, which were reduced to 3.23c. per lb. for No. 10 gage, but are still being quoted at 3.28c. per lb., base, by most warehouses. Both black and galvanized sheets are unchanged at 3.75c. for No. 28 gage black and 4.75c. for No. 28 gage galvanized. On open-hearth spring steel, as low as 3.25c. per lb. is being done by certain warehouses, but as a rule these sellers do not carry complete stocks. A fair range of the present market is 3.50c. to 6c. per lb. Tire steel has been reduced to 2.40c. per lb. with smooth finish at 2.60c. per lb. Wrought iron and steel pipe show no change from the dullness that has prevailed for some time. Brass and copper warehouses report good business. We quote prices on page 912.

Cast-Iron Pipe.—The market continues extremely active with both private and municipal buying. The recent stiffening in prices has caused an advance of $1.50 per ton by one maker of cast-iron pipe and others are expected to follow. On March 29, the Rochester, N. Y., Board of Contracting and Supply opened bids on 1200 tons of 6-in. to 36-in. cast-iron pipe. April 3, the Department of Water Supply, Gas and Electricity, New York, will open bids, submitted by makers direct, on 4300 tons of 6-in., 8-in., 10-in. and 12-in. and about 230 tons of fittings. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $48.80; 4-in. and 5-in., $53.80; 3-in., $63.80, with $4 additional for Class A and gas pipe.

High Speed Steel.—The market is still dull, but a few orders moderate in size are beginning to appear. Prices continue at from 75c. to 85c. per lb. for 18 per cent tungsten high speed steel, with special brands of some companies ranging up to as high as $1.05 per lb.

Coke.—The price of by-product coke has been advanced about 25c. to most points and $8.84 is now quoted for coke for delivery to points on the Pennsylvania, Erie and Lackawanna railroads and $9.09 to points on the Central of New Jersey. Prices on beehive grades range from $4.50 to $5, but no sales at the higher price have been recorded and the prospect of the coal miners' strike fails to cause excitement.

Old Material.—The upward trend in the market is still strong, although some dealers do not feel that there has been any appreciable improvement over last week's activity. Buying continues to be confined largely to western Pennsylvania mills. No. 1 heavy melting steel is unchanged, holding steadily to from $9 to $9.50 per ton as a buying price. Other items are up from 50c. to $1. Despite present activity and optimism, dealers are not piling on yards to any extent. Most of the present buying is small.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$9.00 to	$9.50
Steel rails, short lengths, or equivalent	10.00 to	10.50
Rerolling rails	10.00 to	10.50
Relaying rails, nominal	27.00 to	28.00
Steel car axles	10.50 to	11.00
Iron car axles	18.50 to	19.00
No. 1 railroad wrought	10.00 to	10.50
Wrought iron track	9.50 to	10.00
Forge fire	5.50 to	6.00
No. 1 yard wrought, long	10.00 to	10.50
Cast borings (clean)	7.00 to	7.50
Machine-shop turnings	6.00 to	6.50
Mixed borings and turnings	6.00 to	6.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.50 to	9.00
Stove plate	10.50 to	11.00
Locomotive grate bars	10.50 to	11.00
Malleable cast (railroad)	9.00 to	9.50
Cast-iron car wheels	10.50 to	11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to	$17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to	16.50
No. 1 heavy cast, not cupola size	14.00 to	14.50
No. 2 cast (radiators, cast boilers, etc.)	11.00 to	11.50

Cleveland

CLEVELAND, March 28.

Iron Ore.—Interest in the trade is centered in ore prices for the season and the possibility of lower freight rates from the mines to the upper lake docks. As far as opinion of sellers has been crystallized, it seems to be that a reduction of more than 50 cents a ton on the price of ore at the mine cannot be made. To this would be added any reductions that may be made in carrying rates between the mines and the lower lake ports. While there is nothing as yet tangible on which to base expectations, shippers are inclined to believe that there will be some reductions in railroad rates on ore from the mines to the upper lake ports. This would probably be a temporary reduction for the season, as a decision of the Interstate Commerce Commission on the ore rate case is not expected before the end of the shipping season. The suggestion has been made to the Northern railroads that they make a temporary rate cut of 25 cents per ton on ore. One shipper has estimated that the seasons ore movement will reach 40,000,000 tons. This figure is based on an estimated blast furnace operation of 65 per cent from May 1 to Jan. 1 and 80 per cent from Jan. 1 to May 1, 1923. Other estimates of a 35,000,000 ton movement have been made. Ore on hand at furnaces and Lake Erie docks March 1 amounted to 31,206,000 tons, as compared with 31,528,000 tons on the same date a year ago. The amount in the furnace yards on March 1 was approximately 23,150,000 tons. During February 2,505,000 tons of Lake Superior ore was consumed, as compared with 2,493,000 tons during January and 2,947,000 tons during February last year.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Furnaces booked a large number of orders during the week, but these were mostly for small lots and the aggregate tonnage was somewhat less than during the previous week. The Westinghouse Electric & Mfg. Co. placed 1500 tons of foundry iron with a Cleveland producer for its Cleveland plant. The same seller disposed of 200 tons for shipment from the Valley to the Westinghouse company's Pittsburgh plant. An Ohio consumer placed 1200 tons of malleable iron with a Cleveland furnace. A Johnstown, Pa., consumer came in the market for 500 tons of foundry iron. For Cleveland delivery prices appear well maintained at $19 to $19.50 for No. 2 foundry iron, with a few sales reported at $19.75 to $20. For outside shipment, price irregularity continues with $18.50 generally regarded as about the minimum price, but this might be shaded for shipments to points requiring the absorption of a high freight rate by the seller. One producer continues to quote foundry iron on a $19 Valley base for shipment from Cleveland. Shipments are still good and March will show a large gain in both shipments and sales over February and over any previous month for a year. One interest has booked about 50,000 tons this month. Another sold 4000 tons in small lots during the week. Several sales of Southern iron in lots around 200 tons are reported at $15.50 base with the usual differential for high silicon, but Southern iron is still to be had at $15.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic		$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$18.50 to	19.50
Southern fdy., sil. 1.75 to 2.25	21.67 to	22.17
Ohio silvery, sil. 8 per cent		30.86
Standard low phos., Valley furnace	30.00 to	31.00

Semi-Finished Steel.—Sales of sheet bars aggregating 1500 tons have been made at $31, which is now being quoted by Youngstown district mills. These mills are naming a 50c. differential between sheet bars and slabs, quoting the latter and small billets at $30.50 and 4 x 4-in. billets at $29.50. Considerable inquiry has come out for second quarter sheet bar contracts. Mills recently have been buying from week to week. The McKinney Steel Co. is considering starting up its steel plant in April.

Finished Material.—The market has further stiffened so that 1.50c. more nearly represents the going price on steel bars, plates and structural material than a week ago. While no large sales are reported at the advance, a few carload orders have been taken at the 1.50c. price. Some independent mills that have advanced prices took considerable business during the week at the 1.40c. price on protections granted before the advance. The action of the leading interest announcing through Judge Gary that it will follow the market in respect to prices has given the entire price situation a firmer tone. The Cleveland Steel Co. has advanced its price on light plates $1 per ton to 1.65c. The Cambria Steel Co. has advanced its price on wire rods $2 per ton to $38, Pittsburgh. A heavy tonnage was booked during the week in lots up to 1000 tons, largely in bar products. The buying was well distributed among various manufacturing industries and jobbers. Several round lot orders came from the automobile industry. The 2000 tons of reinforcing bars for the Baldwin Reservoir, Cleveland, have been placed with a Buffalo mill at an average price of 1.55c., delivered, quotations being made on this business before the price advance. New inquiries for steel for specific work are rather light, although new oil tank work has come out requiring 2000 to 3000 tons of plates. New building work is dragging locally because of the builders' unions' strike. The Bellefontaine Bridge Co. has taken school buildings at Middletown, Ohio, requiring 225 tons, and the Donovan Wire & Iron Co., Toledo, Ohio, has taken the Alexander Hamilton School, Toledo, Ohio, requiring 100 tons. An inquiry has come out for 800 tons of structural steel for grade crossing elimination work at Rochester, N. Y. Makers of hard steel reinforcing bars are making no attempt to advance price above the 1.40c. base. Reinforcing bar business placed includes 200 tons for a road near Chagrin Falls, Ohio. German makers of hardened and ground rolls are naming very low prices in efforts to compete with American manufacturers. As compared with an average domestic price of 70c. per lb., German rolls are being offered at 60c. per lb. or lower, for any size or shape, and sales of sample pairs of these German rolls have been made in this territory.

Jobbers quote steel bars, 2.21c.; plates and structural shapes, 2.46c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.06c. to 3.10c.; hoops and bands, 2.56c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Sheets.—Some of the independent sheet mills have advanced prices $3 per ton effective April 1 to 3.15c. for black, 4.15c. for galvanized and 4.50c. for automobile body sheets. It is apparent, however, that this advance will not be general at present, for one leading Valley district producer announced that it will adhere to present prices unless the American Sheet & Tin Plate Co. makes an advance. While the stiffening of the market has brought out some business, it has not caused any general rush to get under cover.

Coke.—Connellsville foundry coke is quoted at $4.50 to $5 per ton with sales limited to car loads. Several sales of Virginia foundry coke are reported at $5.50.

Bolts, Nuts and Rivets.—The stiffening in steel prices has been reflected in the bolt and nut market. Several manufacturers who have been shading recent prices by granting up to 5 per cent additional discount have withdrawn quotations below regular discounts, and announce that they will adhere to regular prices. There is also some talk of an advance, as manufacturers claim that for some time they have been losing money at the prevailing price. Sales have further increased. While buying is mostly in small lots, some good sized orders have been placed by jobbers. The demand for rivets in small lots is slowly gaining. Local manufacturers continue to adhere to 2.10c. for structural and 2.20c. for boiler rivets.

Old Material.—The market is very firm but not active. Dealers have continued to force prices up although before the last advance they were higher on some grades than mills were willing to pay. During the week, advances ranging from 25c. to $1 per ton were made in spite of the fact that there was very little buying by the consumers. While some dealers are

covering on short sales it is claimed that other buying is of a speculative nature. Dealers are offering $16 for heavy melting steel for Youngstown delivery and $11 for machine shop turnings for Cleveland delivery.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$13.25 to $13.75
Steel rails under 3 ft	13.75 to 14.00
Steel rails, rerolling	16.50 to 17.00
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	14.25 to 15.00
Cast borings	10.50 to 10.75
Machine shop turnings	10.50 to 10.75
Mixed borings and short turnings	10.50 to 10.75
Compressed steel	10.25 to 10.50
Railroad wrought	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Light bundled sheet stampings	9.00 to 10.00
Steel axle turnings	11.50 to 11.75
No. 1 cast	15.50 to 16.50
No. 1 busheling	10.00 to 10.50
Drop forge flashings over 10 in	10.75 to 11.00
Drop forge flashings under 10 in	11.00 to 11.25
Railroad grate bars	13.25 to 13.50
Stove plate	13.50 to 13.75
Pipes and flues	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., March 28.

Pig Iron.—At least two makers were on a base of $15.50 minimum at the opening of the week. One advanced to that base from $15 minimum on March 25 after having a week's booking of 6000 tons and turning down additional tonnage offered for the second quarter. This interest has sold April make and 6000 to 7000 tons additional for April delivery and by end of April, if production is not increased, will not have a ton on yards. Another maker has been on a $15.50 base straight along and has done good business at it, having very little left for second quarter. This maker turned down an offer of 5000 tons for second quarter because it could not handle that and care for prior bookings on present capacity. This maker also booked 6000 tons last week and has no iron on yards. The United States Cast Iron Pipe & Foundry Co. is known to have made large bookings. Belleville, Ill., has probably taken 15,000 tons of Birmingham iron from three different makers. Louisville, St. Louis and Cincinnati have booked heavily. A Southern pipe maker is inquiring for as much as 15,000 tons. The inquiry was stronger as the past week reached its wane. All makers are avoiding third quarter business and it cannot be done on the $15 base. Third quarter bookings that have been made were in connection with second quarter iron. Second quarter books of three active interests will admit very little more. Furnace resumption is being held back for higher prices, but several are ready for resumption on short notice.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$15.00 to $15.50
Basic	14.00 to 14.50
Charcoal, warm blast	30.00

Finishing Mills.—Tennessee company mills were on double turn this week, this being the case at Bessemer plate, guide and bar mills and Ensley blooming and rail mills. The open-hearth department was on full turn with effort exerted at capacity production. Large additions to working forces at mines and quarries have been made. The Gulf States Steel Co. has been receiving Far Eastern, South American and Pacific Coast business. Steel hoop and band business is picking up. Orders for West Indies and Argentine have been booked.

Cast Iron Pipe.—United States Cast Iron & Foundry Co. was low bidder on 3800 tons for Federal barracks at Honolulu according to cable advices received in Birmingham. That pipe will probably be made in Birmingham. Birmingham pressure pipe makers are holding firm at $33 minimum base. No contracts for sublease of the De Lavaud process have been closed in Birmingham although a tentative offer is understood to have been made. Sanitary pipe jobbers began coming into the market toward the close of the week and considerable Eastern business was done at $37 base.

Coal and Coke.—Spot coke has sold at $5.25 owing to the strength of the market. Alabama coal operators have no fear of any action that the few small local unions in Alabama may take April 1, but are arranging for larger production in case they are called on to supply deficiencies in the competitive field. Steam coal is at $2 f. o. b. mines.

Old Material.—Scrap market is brisk, but prices not satisfactory to the dealers. Distress steel has been absorbed and large dealers now hold more firmly for market quotations. The Mobile & Ohio Railroad has offered a rate of $4.25 to St. Louis in place of the present rate of $6.27. The matter will be brought to the attention of the Southern Freight Rate Committee in Atlanta this week.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$12.00 to $13.00
No. 1 steel	11.00 to 12.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	11.00 to 12.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	4.00 to 5.00

Cincinnati

CINCINNATI, March 28.

Pig Iron.—The local market continued to show fair activity during the week, and several sales of fair sized tonnages are reported. A Kentucky sanitary manufacturing company bought 3000 tons of Southern iron, and a local melter 500 tons. A number of orders ranging from carloads to 400 tons were booked by local sellers for Southern furnaces, some of this iron being for shipment into Cleveland and Pittsburgh districts. On Northern iron we note a sale of 600 tons of malleable to an Indiana manufacturer, and 400 tons of Bessemer to a Michigan melter. A number of orders for foundry iron are also reported, as well as a few orders for alloys. Prices on Southern irons are inclined to advance, a furnace which had been booking considerable iron at $15, base, having advanced during the week to $15.50; in fact, the greater part of the tonnage booked for Southern furnaces is being taken at $15.50, but a desirable tonnage can still be booked at $15. In the North, no price changes are reported. Chicago iron is firm at $20 and Valley at $19. Lake front furnaces are quoting $18.50 to $19, and the same range applies to southern Ohio, with most of the business going at the higher figure. Silvery iron is quiet, but reports are current that an advance of $2 a ton will shortly become effective. While inquiries are rather scarce, the largest being for 500 tons of malleable for an Indiana melter, salesmen covering the territory report a greatly increased melt over the month of February and the prospects for the future much improved. The prospect of a coal strike is being faced with equanimity, and a general tieup is not considered among the possibilities.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$19.50 to $20.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	20.00 to 20.50
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	21.02 to 21.52
Basic, Northern	21.02
Malleable	21.52 to 22.02

Finished Material.—Sheet bookings in the Cincinnati district during the week were very fair, one company reporting that all its offices were booking sufficient tonnage to take care of its entire output each week. There is a big demand for automobile sheets and also for specialties and while the bulk of the business is still for immediate shipment, greater interest is being taken for requirements for second quarter. The Wheeling Steel Corporation's announcement that on April 1 sheet prices will advance $3 per ton is expected to be followed by similar announcements from other mills, and as a result some business is being booked for shipment during the next 60 or 90 days. In the heavier products, business is only fair and buyers, apparently having covered for their immediate needs before the independents' prices moved up, are now awaiting further developments. Recent advances in

semi-finished materials have served to bring out some business on which commitments had been made. An attempt is now being made to move up prices on bolts and nuts, and one or two manufacturers have already announced an advance. Tin plate orders are increasing steadily and the price situation is much firmer than it has been for some months. In pipe, stock orders are about the only business moving. The Big Four Railroad has placed 500 tons of tie plates, the business being divided between Pittsburgh and Chicago mills. For reinforcing bars, several fair sized orders were placed with Valley mills, one of 600 tons and one of 400 tons being reported. Inquiries current include 800 tons of bars, 300 tons of plates and 500 tons of structural steel. In the structural field, there have been no awards of consequence. H. C. Godman & Co., Columbus, have awarded the contract to R. H. Evans & Co. for a factory building involving 500 tons of bars. The same contracting firm has been awarded the Y. M. C. A. building at Columbus, taking 400 tons of bars and 500 tons of shapes. The Standard Oil Co. has awarded an oil tank at Manistique, Mich., to the American Bridge Co., involving 205 tons. The Western Gas Construction, Ft. Wayne, has been awarded a 300-ton gas holder at New Albany, Ind., and the Stacey Mfg. Co., Cincinnati, will fabricate a gas holder for Royal Oak, Mich., involving 200 tons and one for Perry, Iowa, involving 100 tons. Pending projects include an exposition building for Indianapolis, which will come up next fall. The auditorium and market building at Memphis, Tenn., involving 3300 tons, will be up again for bids about May 1. A warehouse building for the Belknap Hardware Co., Louisville, is expected to be awarded shortly. Bids will close on March 27 for the Snowden building at Memphis, involving 1000 tons. The North High School at Columbus, Ohio, expected to take 600 to 1000 tons of steel, will be up for bids about April 1, and a 12-story office building for Ironton, Ohio, and a similar structure for Canton, Ohio, will be up about May 1. Bids will be taken for the new Hotel William at Columbus, about July 1. Awards are yet to be made on the Business Men's Club at Cincinnati and the Y. M. C. A. building at Middletown, Ohio; on the former project, it is said that a number of bidders have withdrawn their propositions on account of the increased prices of steel recently put into effect by independent mills.

Plant Operations.—The American Rolling Mill Co., will have the biggest operation in over a year during the coming week. The Middletown and Zanesville plants are expected to run full and three mills will likely be in operation at the recently acquired Ashland plant. The Andrews Steel Co. will have two open hearths on and the blooming mill in operation. The Newport Rolling Mill Co. will put on two additional sheet mills, giving it a total of 10 now in operation. At Portsmouth, the Whitaker-Glessner Co. will be running on a 50 per cent basis and the plant of the Ashland Steel Co. will be running at approximately 60 per cent.

Warehouse Business.—Local warehouses report business picking up steadily and the number of orders booked during the week is highly satisfactory. Local jobbers have made reductions of $3 a ton on bars, shapes, plates and cold-rolled steel, but prices on wire products and sheets are unchanged. New prices follow:

Iron and steel bars, 2.60c. base; hoops and bands, 3.20c. base; shapes and plates, 2.70c. base; reinforcing bars, 2.67½c. base; cold rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; common wire nails, $2.75 per keg base; No. 9 annealed wire, $2.60 per 100 lbs.

Coke.—The coke market is easier, and prices are off 25c. a ton on Connellsville fuel. Prices on Wise County and New River coke are unchanged.

Old Material—Some interest is being shown by local foundries in cast scrap, but inquiries are for small tonnages for immediate delivery. Steel plants in this territory have covered for their immediate requirements, and a fair tonnage of blast furnace scrap was purchased by one of them last week. It is largely a dealers' market, and prices have been marked up about 50c. a ton on the assumption that the time is near at hand when consumers will be forced to come into the market.

We quote dealers' buying prices, f.o.b. cars:

	Per Gross Ton	
Bundled sheets	$5.00 to	$5.50
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	25.50
Rerolling steel rails	10.50 to	11.00
Heavy melting steel	10.00 to	10.50
Steel rails for melting	10.00 to	10.50
Car wheels	12.50 to	13.00
	Per Net Ton	
No. 1 railroad wrought	9.50 to	10.00
Cast borings	4.50 to	5.00
Steel turnings	3.50 to	4.00
Railroad cast	12.50 to	13.00
No. 1 machinery	14.50 to	15.00
Burnt scrap	8.00 to	8.50
Iron axles	16.50 to	17.00
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	4.50

Boston

BOSTON, March 28.

Pig Iron.—Sales made the past week involve no large tonnages, and in the aggregate amount to 3,000 to 3,500 tons. The largest purchase by any one interest was 700 tons equally divided between No. 2X and No. 1X, by a nearby foundry. Other sales ranged from car-lots to 400 tons. No. 2X is the most active grade, No. 1X next, and special analysis third, No. 2 plain bringing up in last place. Buffalo No. 2X and No. 2 plain sold the past week at $18, and No. 1X at $18.25 and higher. The Buffalo market therefore is classified as firmer. One eastern Pennsylvania interest has made further sales of No. 2X at $19 furnace, but other furnaces in that district are securing more small orders at $20 furnace base than heretofore. The leading Virginia furnace, out of blast, but offering iron out of stock, has withdrawn from the market. Alabama iron continues in demand for mixture purposes at several dollars per ton above the delivered price of other brands.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., sil. 2.25 to 2.75	$23.06 to	$24.56
East. Penn., sil. 1.75 to 2.25	23.06 to	24.06
Buffalo, sil. 2.25 to 2.75	23.46 to	23.96
Buffalo, sil. 1.75 to 2.25	23.46 to	23.96
Virginia, sil. 2.25 to 2.75		29.58
Virginia, sil. 1.75 to 2.25		29.08
Alabama, sil. 2.25 to 2.75	26.16 to	26.66
Alabama, sil. 1.75 to 2.25	25.66 to	26.16

Finished Material.—Bookings by steel companies are fairly satisfactory, but not as heavy as previous to the recent stiffening in prices. The Boston & Maine railroad is inquiring on 11,000 tons of 85-lb. and 100-lb. rails and 26,500 pairs of angle bars. That carrier has purchased more than half a million tie plates from an eastern Pennsylvania mill. The Connecticut Co. has ordered 25 semi-steel one-man cars, costing $125,000, from the Osgood Bradley Car Co., Worcester, Mass. One eastern Massachusetts street railway is inquiring on $40,000 of frogs and switches for replacements, and a western Massachusetts on about $25,000. The Boston Transit Commission is inquiring on 950 tons structural steel for its East Boston tunnel loop. The New England Structural Co. is awarded 900 tons for the Sumner Co., Boston building, the only important letting of structural steel reported the past week. Several thousand tons, in round lots, are expected to be closed this week, however.

Jobbers now quote: Soft steel bars, $2.55½ per 100 lb. base; flats, $3.05½; concrete bars, stock lengths, $2.55½; structural angles and beams, $2.65½; plates, $2.65½ to $2.83; tire steel, $3.85 to $4.25; open hearth spring steel, $4.50; crucible spring steel, $11.50; bands, $3.15½ to $3.53; hoop steel, $3.15½; cold rolled steel, $3.40 to $3.90; toe calk steel, $8; refined iron, $2.55½ per 100 lb. base; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $5.50; No. 10 blue annealed sheets, $3.48 per 100 lb. base; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50.

Warehouse Business.—Slight reductions are announced by warehouse interests on a few items listed. For instance, light plates are 77½c. per 100 lb. lower, cold rolled steel 30c., steel bands 25c., soft steel bars, reinforcing bars, structural steels cut to lengths, ¼ in. and heavier plates, and refined iron 15c. cheaper. Otherwise prices remain unchanged. The movement

of iron, steel, bolts and nuts out of local stocks shows further expansion. Cut nails are 25c. per keg lower.

Soft steel bars, $2.40½ per 100 lb. base; flats, $3.05½; concrete bars, $2.20 to $2.68; structural steel, $2.40½ to $2.50½; tire steel, $3.85 to $4.25; open-hearth spring steel, $4 to $5.50; crucible spring steel, $11.50; steel bands, $2.90½ to $3.53; hoop steel, $3.31½; cold rolled steel, $3 to $3.50; refined iron, $2.40½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $5.50.

Coke.—New England producers of by-product foundry coke are booking last half contracts based on prices ruling at date of shipment. Foundries continue to order against first half contracts for March and April delivery in anticipation of possible trouble after April 1, but this movement has slowed down materially during the past fortnight, most melters having sufficient fuel on hand, based on present operations, to last several months. Both the New England Coal & Coke Co. and the Providence Gas Co. are quoting as heretofore. The basis for April shipments will be announced late this week.

Old Material.—The market was less active the past week, but prices with two exceptions remain unchanged. Rolling mill borings have become a drug on the market and are cheaper. Buying of skeleton by Pennsylvania interests has lifted prices 50c. Further sales of heavy melting steel to New England and outside consumers are noted, but tonnages involved are comparatively small. Pennsylvania mills also have bought limited tonnages of turnings. Sales of machinery cast to New England foundries in car lots are slightly more numerous, prices ranging from $18 to $19.25 delivered, according to the freight. H. Jacobs & Sons, North Adams, Mass., have purchased the property of the Conway & South River Street Railway, including six miles of trackage, rolling stock, switches, power house, generators, etc.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery	$17.50 to $18.00
No. 2 machinery	15.50 to 16.00
Stove plate	14.50 to 15.00
Railroad malleable	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	9.50 to 10.00
Wrought pipe (1 in. in diam., over 2 ft. long)	7.25 to 7.75
Machine shop turnings	5.50 to 6.00
Cast iron borings, rolling mill	6.50 to 7.00
Cast iron borings, chemical	9.00 to 9.50
Blast furnace borings and turnings	5.50 to 6.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles	11.50 to 12.00
Shafting	12.00 to 13.00
Car wheels	11.00 to 11.50
Rerolling rails	9.50 to 10.00

Buffalo

BUFFALO, March 28.

Pig Iron.—Stiffening in prices about April 1, is regarded as certain by the majority of sellers and even now it is difficult to find iron quoted less than $18.50 for No. 2 plain—whereas two weeks ago sales at $18 base were common, but little was closed below that figure. The reported quotation of $17.75 base was undoubtedly made but on only one or two transactions. Increased operation in the steel departments of the Donner Steel Co. may require a change in blast furnace operation and one of the two furnaces now blowing on foundry iron may be put on basic for a short time. While there is no fixed differential, higher silicons are bringing better prices; one furnace reporting a sale of a carload lot of iron, silicon 3.48, for $20.50. There is hardly any change in the general run of business and with the exception of two inquiries for 3000 tons each, and one for 1500 tons, the general run of inquiries deal with carload and 100-ton lots. An inquiry for 2000 tons of basic to one furnace did not bring a quotation as the interest referred to did not have the iron on hand and there is no immediate prospect of having such a tonnage.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$18.50 to $19.00
No. 2X foundry, 2.25 to 2.75 sil.	18.50 to 19.00
No. 2 plain, 1.75 to 2.25 sil.	18.00 to 18.50
Basic	18.00 to 18.25
Malleable	18.00 to 18.50
Lake Superior charcoal	26.14

Finished Iron and Steel.—Generally the situation is more satisfactory than in some time. Operation is greater and sales, both in the number of transactions and calls for material, have shown improvement. Expectation that prices will advance shortly has stimulated business with particular bearing on sheets. It is understood that black sheets will go to $3.15 April 1. Bar and structural business—the latter in small lots—has brightened considerably, but plate demand is dull. Only one Buffalo selling factor is quoting less than 1.50c. on bars. A disposition to buy for more than immediate needs is apparent. There is a dearth of structural work involving large tonnages but some small jobs have been closed. The Kellogg Structural Steel Co. will fabricate 200 tons for two additional buildings for the Merchants' Despatch of Rochester, and 100 tons for the Buffalo Chemical Fire Extinguisher Co. A new department house in Richmond Avenue, Buffalo, is planned but the steel requirements have not been announced. Bids for the new Genesee building will be opened next week and it is understood about 3000 tons will be required. An inquiry for 1500 tons of reinforcing bars for a subway in Rochester is in the hands of one bar maker. A number of New York State highway jobs requiring on the average of 50 tons of reinforcing bars have been awarded.

Warehouse Business.—Sheet demand is livelier than any other warehouse material but the spring trade has appeared and improvement is gradual. Prices have changed on a few products not due to weakening in demand, but to adjust Buffalo prices on a basis with warehouse prices elsewhere.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.50c.; plates, 2.50c.; soft steel bars and shapes, 2.40c.; hoops, 3.15c.; bands, 3c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.65c.; cold-rolled round shafting, 3.20c.

Old Material.—Not as many new sales marked recent activity in old material as have been made in the preceding weeks in March. Machinery cast scrap is being called for in a brisk way, but in other materials the mills seem to have supplied their wants for the time being. The prices now being quoted will not be changed in the near future, dealers believe.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.50 to $14.00
Low phos., 0.04 and under	16.50 to 17.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	8.00 to 9.00
Cast iron borings	9.50 to 10.00
Heavy axle turnings	12.00 to 12.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	14.00 to 15.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

St. Louis

ST. LOUIS, March 28.

Pig Iron.—Melters in this district are doing more business, and with an increased demand for their products has come heavier buying of pig iron. The Eighth Federal Reserve Bank reports that the melt increased approximately 7¾ per cent during the month, and new business placed with foundries, mills and machine shops was larger than in several months. Seven leading stove manufacturers in the district report gains of from 41 to 150 per cent over February, 1921, and from 10 to 60 per cent over January, 1922. Gains also are reported by implement manufacturers. The last week was marked by several large sales, the most important being 5000 tons of basic to an east side melter for prompt shipment by the local maker, who also sold 700 tons of basic to a local plant, 350 tons of malleable to an Indiana melter, 100 tons of basic for immediate shipment to a Pacific Coast melter and 100 tons of foundry iron to an Evansville, Ill., melter. A Quincy, Ill., stove manufacturer bought 1000 tons. Most of the Southern iron was sold by a maker for barge and rail shipment on the basis of $16, Sheffield, or $19.44 f.o.b. St. Louis, this maker's sales for the week being about 700 tons in lots of from a carload to 200 tons. A recent shipment was made from Sheffield to Belleville, Ill., in seven days. The most important inquiry was from a

Western radiator manufacturer for 5000 to 10,000 tons of foundry iron for second quarter shipment, and a gasoline engine manufacturer in the district wants 350 tons of foundry iron. An inquiry for 2000 tons for a Southwestern car wheel manufacturer, reported in THE IRON AGE several weeks ago is still pending. There was a heavier run of carload orders. The market for Northern iron is firm at $20, Chicago.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$22.80
Northern malleable, sil. 1.75 to 2.25	22.80
Basic	22.80
Southern foundry, all rail, sil. 1.75 to 2.25	$20.74 to 21.24
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	19.44

Finished Iron and Steel.—The outstanding feature of the week in these lines was the heavy purchase of tie plates, the Missouri Pacific Railroad buying 500,000 tie plates with a tonnage of 2500, the Railway Supply Co. getting the order. The Wabash order of 160,000 tie plates went to the Illinois Steel Co. The Louisville & Nashville Railroad is in the market for 500 150-ton all-steel hopper cars and 500 to 1000 all-steel composite cars. The Missouri, Kansas & Texas Railway is in the market for 360 wheels, involving 135 tons, for 30 passenger coaches. The general contract for the University of Missouri power plant at Columbia has been awarded to Collins Brothers, Kansas City, the job involving 160 tons of structural steel.

For stock out of warehouse we quote: Soft steel bars, 2.37½c. per lb.; iron bars, 2.37½c.; structural shapes, 2.47½c.; tank plates, 2.47½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.09½ per 100 lb.; boiler rivets, 3.19½; tank rivets, 7/16-in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, $4; and tapped, $3.75 off list.

Coke.—There is an increasing demand for coke in all lines. Users are ordering for immediate shipment and are insisting that it be immediate, traffic departments being kept busy tracing cars through to destination. Shipping specifications against contracts are being increased.

Old Material.—The old material market has been strengthened materially by the brighter outlook and recently advancing prices for finished steel. One of the large consumers recently purchased quietly a round tonnage of miscellaneous steel rails. The consequence is that the dealers are wildly excited, and a great deal of speculative buying in anticipation of further advances has been a feature of the market. There are no railroad offerings of consequence before the market this week.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$16.00 to	$16.50
Steel rails, rerolling	13.00 to	13.50
Steel rails, less than 3 ft	12.50 to	13.00
Relaying rails, standard section	23.00 to	28.00
Cast iron car wheels	15.50 to	16.00
No. 1 railroad heavy melting steel	11.50 to	12.00
No. 1 heavy shoveling steel	11.00 to	11.50
Ordinary shoveling steel	11.00 to	11.50
Frogs, switches and guards, cut apart	11.50 to	12.00
Ordinary bundle sheets	5.00 to	5.50
Cast steel bolsters	12.00 to	12.50
	Per Net Ton	
Heavy axle and tire turnings	7.00 to	7.50
Iron angle bars	15.00 to	15.50
Steel angle bars	11.50 to	12.00
Iron car axles	20.00 to	20.50
Steel car axles	14.50 to	15.00
Wrought iron arch bars and transoms	16.00 to	16.50
No. 1 railroad wrought	11.00 to	11.50
No. 2 railroad wrought	10.50 to	11.00
Railroad springs	12.50 to	13.00
Steel couplers and knuckles	12.50 to	13.00
Locomotive tires, 42 in. and over, smooth inside	11.00 to	11.50
No. 1 dealers' forge	9.50 to	10.00
Cast iron borings	6.50 to	7.00
No. 1 busheling	10.00 to	10.50
No. 1 boilers cut in sheets and rings	7.00 to	7.50
No. 1 railroad cast	14.00 to	14.50
Stove plate and light cast	13.00 to	13.50
Railroad malleable	12.00 to	12.50
Agricultural malleable	12.00 to	12.50
Pipes and flues	8.00 to	8.50
Heavy railroad sheet and tank	7.00 to	7.50
Light railroad sheet	4.50 to	5.00
Railroad grate bars	11.50 to	12.00
Machine shop turnings	4.00 to	4.50
Country mixed iron	8.00 to	8.50
Uncut railroad mixed	9.50 to	10.00
Horseshoes	9.50 to	10.00
Railroad brake shoes	11.00 to	11.50

British Iron and Steel Market

Home Demand Still in Doldrums—Foreign Business Fairly Active—Billets and Tin Plate Stiffer—Labor Deadlock Persists

(By Cable)

LONDON, ENGLAND, March 28.

Labor is in a very unsettled condition. The negotiations with the engineering trades continue.

Pig iron is dull; there is a decrease in the demand from home foundries. Two Cleveland furnaces are shortly to be blown out, and one Northeastern furnace has been blown out. There is an improved export demand, but foreign consumers are awaiting further price reductions, which at present are impracticable.

Home demand for hematite is slow and the export business is quieter, though Germany is still purchasing. Two additional furnaces were started last week.

There is an increased demand for foreign ores. Sellers of Bilbao Rubio are quoting 27s. ($5.87) ex-ship Tees, as last week.

Coke is weak, owing to lessened demand. Export demand is active, but home inquiry has diminished.

There is good export inquiry for finished steel, but little business in the home trade, which is stagnant. Specifications on home orders are barely forthcoming, owing to the industrial upheaval. Prices remain firm.

Continental pig iron prices are easier. Belgian and Luxemburg foundry irons may be had at £4 17½s. ($21.21) f.o.b., for May delivery. French foundry iron is held at £5 5s. to £5 10s. ($22.84 to $23.93) f.o.b., for May and June shipment.

Continental steel is quiet. French, Belgian and Luxemburg merchant bars are held at £8 to £8 10s. (1.55 to 1.65c. per lb.) f.o.b., for May and June delivery. Belgian and Luxemburg steel beams are obtainable at £7 10s. to £7 15s. (1.46 to 1.51c. per lb.) f.o.b., for April and May shipment.

German 3/16-in. plates are quoted at £8 7½s. (1.63c. per lb.) f.o.b., for May shipment. Belgian 3/16-in. plates are held at £8 7½s. to £8 15s. (1.63 to 1.70c. per lb.) f.o.b., for May and June delivery.

German merchants are quoting wire rods at £9 ($39.15) f.o.b. for June and July shipment. Belgian sheet bars are being sold at £6 15s. ($29.36) f.o.b., for delivery in April. Prompt tin plate is firmer on increased demand, owing to bear covering by merchants. Prompt delivery is being sold at 19¼s. ($4.19) basis, f.o.b. Buyers of 28 x 20's are offering 38s. ($8.27) f.o.b., ex-stock; sellers are holding out for more. There is a fair amount of inquiry for forward position. An increased general overseas demand is developing, and exports are improving, sales having been made to Canada, Roumania and Portugal. There are active inquiries from South America and South Africa. Consumers are clearing up stocks and business is improving, but only in small parcels. Portuguese specifications have been sold at 37s. ($8.05) f.o.b. Common wasters are bringing 17s. to 17¼s. ($3.70 to $3.75) basis, f.o.b., ex-stock.

Welsh tin plate bars are being talked of at higher prices.

Galvanized sheets are steady, with small business. The Far-Eastern demand is stagnant. John Lysaght, Ltd., has closed the Australian sheet mills.

Black sheets are dearer; some sellers are able to quote beyond April, only, and some makers are booked to the end of May. There is a fair demand for Japanese specifications of black sheets; merchants are quoting at £18 5s. (3.54c. per lb.) c.i.f. Indian specifications 4 x 2½, 2/5's, have been held at £11 7½s. (2.21c.

per lb.) c.i.f. India. Sheets, 6 x 3, 13's, 107 lb., are firm at £15 15s. (3.06c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.35 per £1, as follows:

Durham coke, delivered.	£1	7½s.				$5.98		
Cleveland No. 1 foundry	4	15				20.66		
Cleveland No. 3 foundry	4	10				19.58		
Cleveland No. 4 foundry	4	7½				19.03		
Cleveland No. 4 forge...	4	10				19.58		
Cleveland basic	4	10				19.58		
Hematite	7	0*				30.45*		
East Coast mixed.....	5	0	to £5	2½s.		21.75 to	$22.29	
East Coast hematite....	4	17½	to 5	0		21.21 to	21.75	
Ferromanganese	15	0	& 14	10*		65.25 &	63.08*	
Rails, 60 lb. and up....	8	0	to 9	10		34.80 to	41.33	
Billets	7	0	to 8	0		30.45 to	34.80	
Sheet and tin plate bars, Welsh	7	0	to 7	7½		30.45 to	32.08	
Tin plates, base box....	0	19	to 0	19½		4.13 to	4.24	
						C. per Lb.		
Ship plates	9	5	to 10	10		1.80 to	2.04	
Boiler plates	12	10	to 14	0		2.43 to	2.72	
Tees	9	10	to 11	0		1.85 to	2.14	
Channels	8	15	to 10	5		1.70 to	1.99	
Beams	8	10	to 10	0		1.65 to	1.94	
Round bars, ¾ to 3 in..	10	10				2.04		
Galvanized sheets, 24 g.	16	0	to 16	5		3.13 to	3.16	
Black sheets	12	10	to 12	15		2.43 to	2.48	
Steel hoops	12	0	& 12	5*		2.33 &	2.38*	
Cold rolled steel strip, 20 g.	23	10				4.56		

*Export price.

MORE EXPORT ACTIVITY

Prices Show Tendency to Stiffen—Foreign Competition Small—China Active in Second Hand Material

NEW YORK, March 28.—March has brought a considerable improvement in the volume of export tonnage booked by American mills, it being estimated at a rate from 40 to 50 per cent of that done in 1920, which was an active year. In the Far East and South America, from which most of the current export business is coming, American mills are obliged to meet the competition of British and Welsh mills on sheets and tin plate, Belgian mills on bars and German mills on wire products, these being the products on which the sharpest competition occurs. For prompt shipment material the American mills have somewhat of an advantage, particularly over German and Belgian mills, which are well filled.

The Chinese market is chiefly active at present on second-hand material, bars, plates, angles and wire shorts. Inquiries are being handled by exporters for tonnages ranging from 500 to 1000 tons, the majority specifying plates. Wire shorts, which are extremely difficult to obtain, are evidently acceptable to Chinese buyers, even at high prices. One exporter has several wire short inquiries in hand ranging from 50 tons up to as high as 200 tons, 13 to 25 gage, received from its Shanghai, Hankow and Tientsin offices. While inquiries as large as 200 tons cannot be filled, it has been possible from time to time to ship tonnages of 50 tons or less of wire shorts. This company recently shipped 100 tons of reinforcing bars and reports considerable activity and apparent prosperity in Manchuria. From its Harbin, Manchuria, office an order for 225 tons of material recently received, included wire, nails, sheets, beams, etc. This activity is expected to increase slightly as spring advances.

Foreign Competition Limited

A Japanese inquiry recently appeared in the market for 100 tons of checkered floor plates and there is an increasing number of sheet inquiries from this source. Both Germany and Belgium are finding it difficult to compete with the United States on delivery and, except for a few products, on price. German aluminum, however, still competes easily with the products of other aluminum producing countries. With the current price of aluminum in the United States about 19.10c. per lb., the German product can be sold as low as 17.75c. per lb., and should the American price be reduced could probably go lower.

On some products in cases where a particular order is considered desirable, the Continental price is unusually low. On tires and rolled steel wheels for 500 box cars to be purchased for a Brazilian railroad, Belgian prices are so much lower than American prices that it is extremely doubtful whether the business will come to this country, our only advantage being in deliveries, which are much better than those promised by Belgian manufacturers.

While the advance in domestic prices on plates, shapes and bars to 1.50c. per lb., Pittsburgh, has not been fully duplicated in export trade, export prices have also stiffened, and it is quite difficult now to buy heavy tonnage products at less than 1.35c. per lb., Pittsburgh. Some weakness still exists in tin plate, which has been sold for export at $4 per base box, Pittsburgh, or slightly less.

American Small-Tool Sales in Britain

Severe competition and large stocks are greatly affecting sales of American-made small tools in Great Britain, according to a recent report of the American Chamber of Commerce in London. It is generally agreed, however, that when trade again approaches normal, certain small tools, which previously enjoyed a good market in the United Kingdom, will do so again. The presence of large stocks in the hands of the Government and dealers, and severe foreign competition, aggravated by depreciated exchanges, are the chief factors affecting American trade. In addition, the price of American precision tools has been considerably increased by an import duty of 33 1/3 per cent, as these tools are scheduled as a key industry under the Safeguarding of Industries act. American designs of small tools have in some instances been copied and are being manufactured by British companies.

At the meeting of the National Association of Brass Manufacturers, held in Cleveland, March 7, 8 and 9, the question of German competition in the United States was discussed and the following warning incorporated into the minutes of the meeting: "Members are warned to look out for German made goods or for representatives of German manufacturers now proselyting in the country, picking up samples and sending them back to Germany to see how cheaply they can make them; also offering inducements to supply competitive articles of German make at less than half the cost of American manufacture."

United States Exhibits, Inc., 156 Broadway, New York, is in charge of the American industrial exhibition buildings at the Brazilian International Centennal Exposition at Rio de Janeiro, Brazil, from Sept. 7 to Dec. 31, 1922. J. W. Finch, director of the United States Exhibits, is now receiving applications for floor space in the buildings devoted to the exhibit of American products.

The Mexican Chamber of Commerce of the United States, Inc., with offices at 233 Broadway, New York, has been organized. The chamber has established Mexican offices at 45 Bolivar Street, Mexico City. The object of the organization is to disseminate general business and economic information, provide market quotations to buyers and sellers of both countries and distribute inquiries for material and requests for services. The following officers have been elected: President, S. L. Alatriste, commercial agent of Mexico; vice-presidents, James W. Gerard, Scott, Gerard & Bowers, New York, Jerome S. Hess, Hardin & Hess, New York, Russell R. Whitmann, *New York Commercial;* treasurer, Jose Miguel Bejarano, president, Bexar Co., New York.

The plant of the Riverdale Rolling Mill Co., manufacturer of bar iron, Riverdale, a suburb of Chicago, was destroyed by a fire of unknown origin on March 25. The rolling mill equipment was not seriously damaged and the building, which was of frame construction, will be replaced by a steel structure.

The Ford Motor Co., Detroit, within the last week or so, has increased its working force by 20 per cent, ex-service men and women being given the preference as to jobs.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.36	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.40c. to 1.50c.

Sheared plates, ¼ in. and heavier, tank quality, 1.40c. to 1.50c.

Wire Products

Wire nails, $2.40 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.25; galvanized wire, $2.75; galvanized barbed wire, $3.05; galvanized fence staples, $3.05; painted barbed wire, $2.55; polished fence staples, $2.55; cement-coated nails, per count keg, $1.90; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 70½ per cent off list for carload lots; 69½ per cent for 1000-rod lots, and 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 10 per cent off list
Machine bolts, small, cut threads....70 and 10 per cent off list
Machine bolts, larger and longer....70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads.70 and 10 per cent off list
Cut threads .....70 per cent off list
Longer and larger sizes.....70 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65, 10 and 5 per cent off list
Larger and longer sizes.....65 and 10 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive..80, 10, 10 and 10 per cent off list
Small sizes S. A. E.....80 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages....80 and 3 tens and 5 per cent off list
Stove bolts in bulk.....80, 3 tens, 5 and 2½ per cent off list
Tire bolts .....70, 10 and 5 per cent off list
Track bolts, carloads.....3c. base
Track bolts, less than carloads.....3.75c. to 4c. base

Upset and Hex. Head Cap Screws

½ in. and under.....80 and 10 to 80, 10 and 10 per cent off list
9/16 in. to ¾ in.....80 and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes .....75 and 10 to 80 per cent off list

Milled Set Screws

All sizes .....70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets.....$2.00 to $2.10
Large boiler rivets..... 2.10 to 2.20
Small rivets .....75 and 10 off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $36; chain rods, $36; screw stock rods, $41; rivet and bolt rods and other rods of that character, $36; high carbon rods, $43 to $46, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2 to $2.10 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.15 to $2.25 base; 5/16-in., $2.15 to $2.25 base. Boat and barge spikes, $2.15 to $2.25 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, 3c. base per 100 lb. Tie plates, $1.75 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.40c. to 1.50c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	5€	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

To large buyers of steel tubes, a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

PERSONAL

Wm. B. Neal, western sales manager, National Cast Iron Pipe Co., Peoples Gas Building, Chicago, will resign effective April 30, to take a similar position with the Somerville Iron Works, Somerville, N. J. and Chattanooga, Tenn., with headquarters at Chicago. A. E. Nelson, district sales representative, National Cast Iron Pipe Co., Kansas City, Mo., will succeed Mr. Neal at Chicago as western sales manager of that company.

C. F. Chase has been appointed general manager Petrie Mfg. Co., Milwaukee. He was for eight years United States representative of the Renfrew Machinery Co. of Canada, and previously served the International Harvester Co. and the Warder, Bushnell & Glessner Co.

John B. Chase, Oconto, Wis., has been elected president Montana Tractor Co., Oconto, filling the vacancy caused by the death of George Beyer.

F. H. Willcox and Wyman Eaton have been named vice-presidents and L. T. Shorley, secretary, of Freyn, Brassert & Co., engineers, Peoples Gas Building, Chicago.

George I. Alden, president Norton Co., Worcester, Mass., grinding machinery and abrasives, is recovering from a serious illness caused by an attack of hiccoughs.

George E. Merrill, Jr., sales department Manning, Maxwell & Moore, Inc., Boston, has secured a leave of absence due to ill health. Mr. Merrill has been associated with the company several years.

R. S. Tucker, Boston sales office Bethlehem Steel Co. has returned to Bethlehem, Pa., and is now assistant to the sales agent in charge of sales of bars, billets and blooms.

A. P. Blackstead, formerly chief engineer of the Camden Iron Works (R. D. Wood & Co.), Camden, N. J., and prior to that hydraulic engineer with the Henry R. Worthington Co., New York, has joined the engineering staff of the Dayton-Dowd Co., manufacturer of centrifugal pumps and approved underwriters' fire pumps. Mr. Blackstead has recently returned from Europe where he spent six months studying conditions and investigating recent developments in hydraulic engineering.

Owing to the recent amalgamation of the two companies, Myles E. Ewing, president the Ewing Bolt & Screw Co. of Detroit, and J. A. Hale, secretary-treasurer of the same company, are now president and secretary-treasurer, respectively, of the Detroit Machine Co. David W. Pell, manager of the Detroit Machine Co., has been made production manager of the bolt and screw plant.

Charles Morgana, formerly in charge of engineering and manufacturing for C. H. Wills & Co., Marysville, Mich., has severed his connection with that company to become general superintendent of the Maxwell Motor Co., Detroit.

Franklin G. Smith, president and general manager Osborn Mfg. Co., Cleveland, returned March 25 from a two months' business trip to Europe.

J. P. Williams has resigned as manager of the No. 2 plant of the Canton Art Metal Co., Canton, Ohio, to become sales manager of the Mosley Safe Co., Hamilton, Ohio. Before becoming associated with the Canton Art Metal Co., he was chief engineer of The Diebold Safe & Lock Co., Canton.

George S. Black has resigned as manager of the Cleveland Engineering Society, Cleveland, owing to poor health.

Louis A. Stroh has resigned as director and treasurer of the Sandusky Foundry & Machinery Co., Sandusky, Ohio.

Wm. H. Weichsel, manager the Dover Works, the American Sheet & Tin Plate Co., Dover, Ohio, has resigned to become manager of the sheet mills of the Inland Steel Co., Indiana Harbor, Ind., effective April 1. W. H. Ashbaugh, Leechsburg, Pa., has been appointed to succeed him. Mr. Weichsel has been in the steel business for 19 years, having started with the Aetna Standard works, at Bridgeport, Ohio. For the past six years he has been at Dover, first as superintendent and for the past year as manager.

At the annual stockholders meeting of the Savage Mountain Fire Brick Co. held at the company's office, Frostburg, Md., March 27, the directors were re-elected, with the addition of the sales manager, Clarence Overend, who was elected to fill the vacant place of Mr. Gorsuch, deceased. At the directors' meeting, John A. Caldwell was re-elected president, together with the re-election of all other officers.

J. C. W. Daly, Chicago, district sales manager, The Townsend Co., New Brighton, Pa., who has been doing special work at the home office of the company, has resumed his regular duties.

H. H. Goodwin, for a number of years connected with the financial department of B. Nicoll & Co., New York, will be in charge of the scrap iron and steel department of the Debevoise-Anderson Co., New York.

The A. O. Smith Corporation, Milwaukee, Wis., manufacturer of pressed steel products, announces the appointment of Fred Mathews, formerly vice-president Union Metal Products Co., to be its general railway sales representative. Mr. Mathews' offices are at 1306 Consumers' Building, Chicago.

J. H. Kramer of the sales department, Bethlehem Steel Co., Philadelphia, has resigned to become associated as vice-president with R. B. Fritch & Co., iron and steel merchants, maintaining warehouse and offices at Third and Venango streets, Philadelphia.

H. H. Bingham has been made general manager of the Charcoal Iron Co. of America, Detroit, succeeding Frank W. Hutchings, who resigned recently. Mr. Bingham has been vice-president, secretary and controller.

James W. Barr, for the past few years with the Vandyck-Churchill Co., machine tool dealer, 149 Broadway, New York, has become Eastern representative of the American Tool Works Co., Cincinnati, machine tool builder, and will work in the East in co-operation with the Vandyck-Churchill Co., which is the selling agent for the American Tool Works Co. in the New York and Philadelphia territories.

Howard K. Moore, secretary of the Portsmouth-Solvay Coke Co., prior to its joint absorption by the Wheeling Steel Corporation and the American Rolling Mill Co., has been appointed assistant general manager of the Steubenville, Ohio, works, Wheeling Steel Corporation. Mr. Moore, who is a brother of G. W. Moore, general superintendent, Portsmouth, Ohio, works of the company, was assistant to Andrew Glass, president of the Whitaker-Glessner Co., at Portsmouth, Ohio, for a number of years and previously had steel works experience in the Eastern plants.

W. P. Hood has been elected assistant treasurer, the Thomas Spacing Machine Co., Pittsburgh, succeeding H. S. Boyd, resigned.

Leslie H. Taylor, formerly sales manager of the machine tool division of the Greenfield Tap & Die Corporation, Greenfield, Mass., has resigned to accept the position of sales manager with the Williams Tool Corporation, Erie, Pa.

Fred W. Howe, vice-president Crompton and Knowles Loom Works, Providence, R. I., plant has booked passage on the S. S. Empress of Asia, for April 20 and will leave from Vancouver, B. C., for a three-months' trip in the Orient mainly in China and Japan.

Sydney R. Mason, secretary Whitin Machine Works, Whitinsville, Mass., recently left for California, and will sail from San Francisco for Japan. Mr. Mason plans to return in June.

Henry F. Favor, superintendent Crompton & Knowles

Loom Works, Providence, R. I., sailed March 16, from Vancouver, B. C., for China and Japan on a business trip.

W. C. Murphy, treasurer Providence Mill Supply Co. Providence, R. I., has retured after a six months' trip to Japan and China.

Alan C. Frazier, formerly of Weston-Dodson & Co., Philadelphia, has been engaged as manager of coal and coke sales for the Iron Trade Products Co., Pittsburgh, for the Philadelphia district, with headquarters in the Pennsylvania Building, Philadelphia.

J. W. McGuire, credit manager in the New York domestic trade office of the Truscon Steel Co., Youngstown, Ohio, has been named credit manager of the company, succeeding O. W. Chaffee, who resigned effective April 1. Mr. McGuire was in the Youngstown office until about two years ago.

Harry Fowler has been appointed district sales manager of the Cincinnati territory of the Carborundum Co., Niagara Falls, N. Y., to succeed Charles R. Cox. The appointment of Mr. Fowler is effective July 1. Mr. Cox will be transferred to the main office of the company where he will take up his new duties as sales statistician.

H. P. Parrock, who recently resigned as general manager of the Lumen Bearing Co., of Ohio, retained his stock interest in the New York company, but not in the Ohio. L. S. Jones, who was elected to the board of managers of the Ohio company, is general sales manager.

Frank Lyman, president Low Moor Iron Co., Low Moor, Va., and Phillips Isham, New York, have returned from a short vacation in the Bermudas.

J. Corbet Davis has been appointed sales manager of Donnelly & Co., Philadelphia, jobbers in bolts and nuts, rivets and washers, supplies and equipment. Mr. Davis was connected for a number of years with Davis Brothers, Philadelphia.

Prof. Edwin Allen Fessenden of the faculty of Pennsylvania State College has been appointed professor of mechanical engineering at Rensselaer Polytechnic Institute, Troy, N. Y., to succeed Prof. Arthur M. Greene, Jr., who becomes dean of the Princeton Engineering School. Professor Fessenden was born in Butler County, Ohio, in 1882. He was graduated from the University of Missouri in 1904. He became an instructor at the University of Missouri in 1905, and from 1907 until 1916 was an associate professor.

S. M. Tomlinson of the firm of Frank Samuel, Harrison Building, Philadelphia, has sailed for Rio de Janeiro and will return in about six weeks.

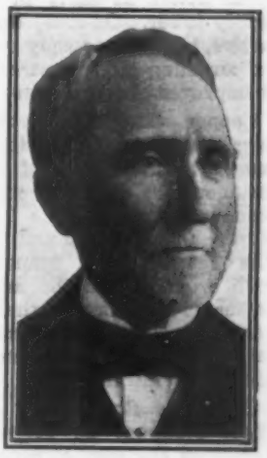
OBITUARY

HENRY B. REDPATH, for nearly 40 years prominently associated with the Nova Scotia Steel & Coal Co., with headquarters at New Glasgow, N. S., died March 22, at the home of his daughter in Boston, from complications following a shock suffered last summer. Mr. Redpath was a native of England, but went to Canada at an early age.

HENRY HESS, founder of the Hess-Bright Mfg. Co., Philadelphia, and of the Hess Steel Corporation, Baltimore, dropped dead from heart disease March 23 at his home in Atlantic City. Mr. Hess, who was 58, had lived at the seashore with his family for two years. He was a former president of the Engineers' Club, Philadelphia, former president of the Society of Automotive Engineers, an officer of the American Society of Mechanical Engineers, a member of the Art Club and various organizations.

SAMUEL MCCLURE, general manager, Stewart Furnace Co., Sharon, Pa., and former state senator, died at his home in Sharon, Pa., March 26. He was one of the leaders in the founding, management and development of industrial and financial institutions of the Shenango Valley. He was born in Little Beaver township, Beaver County, Pa., Jan. 3, 1839. His start in the iron business was in 1873 when he became manager of a blast furnace in West Middlesex, Pa. In January, 1874, he was made superintendent of the Stewart Iron Co. In 1889 he acquired an interest and was elected one of the managers, as well as being general manager of the iron business of the company in the Shenango Valley and of its coking business in Uniontown, Pa. Mr. McClure became associated in 1886 with F. H. Buhl and Daniel Egan, in organizing the Sharon Steel Castings Co., of which he was elected vice-president. In 1902 the plant was acquired by the American Steel Castings Co. and became a constituent company of the American Steel Foundries. He was president of the Sharon Railways Co., the Union Limestone Co. and the Shenango Machine Co. He represented the Forty-seventh District in the Pennsylvania state senate in 1884. He was a Mason and a member of the Duquesne Club of Pittsburgh.

HENRY A. LAUGHLIN, a director of Jones & Laughlin Steel Co., Pittsburgh, and son of James Laughlin, one of the founders of the company, died at his home in Philadelphia, March 22. He had been identified with the company from 1860, following his graduation from Brown University, until about 12 years ago, when he retired from active participation in the steel business and removed from Pittsburgh to Philadelphia. Mr. Laughlin was born in Pittsburgh, Dec. 12, 1838. He was a member of the Sons of the American Revolution, the Duquesne Club, the New York Yacht Club and the Art Club of Philadelphia. His benevolences and charities were numerous and widespread to public welfare and educational institutions. Brown University and the Prinecton Theological Seminary were beneficiaries of endowments made by him. He is survived by a son, James A., of Pittsburgh, and a daughter, Anne Irwin, of Philadelphia, and several grandchildren.



HENRY A. LAUGHLIN

JOHN A. HURLEY, 68 years old, retired manufacturer of Bridgeport, Conn., died at his home in that city, March 20, after an illness of two years. Mr. Hurley was born in New Haven, Conn., April 30, 1854, and removed to Meriden, Conn., when a youth. While there he formed the Hurwood Mfg. Co. with George Wood, and in 1903 the business was moved to Bridgeport, where a large building was erected. In 1911 the business was disposed of to the Coe-Stapley Mfg. Corporation, which removed to West Haven, Conn., in 1919. The firm manufactured sheet metal specialties.

JOHN MCDONALD, organizer of the Pittsburgh Foundry & Machine Co., and its president until he retired from active business in 1902, died at the Homeopathic hospital, Pittsburgh, March 21. He was born in Belfast, Ireland, and was 70 years of age.

DANIEL L. NORRIS, 52 years old, a widely known construction engineer, died March 22 at his home in Newark, N. J., of pneumonia. Mr. Norris came to New York from Chicago in 1900, joined the Fuller Construction Co. and was in charge of construction of some of the largest hotels and other important buildings in New York.

New Prices for Flanging and Dishing

Steel companies which specialize in flanging and dishing of heads have recently announced new reduced prices for this work, and in addition are quoting quantity discounts, which vary from 10 per cent off list for two to four heads of a size to 50 per cent off list when 50 or more heads of a size are ordered.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
March	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
22.....	13.00	12.75	29.25	4.70	4.42½	5.07½	4.72½
23.....	13.00	12.75	29.37½	4.70	4.42½	5.05	4.70
24.....	13.00	12.75	29.37½	4.70	4.42½	5.02½	4.67½
25.....	13.00	12.75	....	4.70	4.42½	5.02½	4.67½
27.....	12.87½	12.62½	29.00	4.70	4.42½	5.00	4.65
28.....	12.87½	12.62½	29.25	4.70	4.42½	5.00	4.65

*Refinery quotation.

New York

NEW YORK, March 28.

A slightly easier tone pervades most of the markets and sales are only moderate. Demand for copper is not as active as early in the month and prices are slightly lower. On most days the tin market has been inactive, but fairly steady as to price. The lead market is if anything slightly stronger. Demand for zinc has not improved and prices are lower.

Copper.—The electrolytic copper market is slightly easier than a week ago, due largely to a slackening in demand, both foreign and domestic. It is argued that consumers are doing a good business in manufactured products and must come into the market in the near future. Present demand can be satisfied by some sellers at 12.62½c., refinery, or 12.87½c., delivered, which is considered the market for April and second quarter. It is conceded that a limited amount of metal is available ½c. below these prices, but it is insignificant. There are also some sellers who will not sell under 13c., delivered.

Tin.—The Straits tin market has been dull and almost stagnant up to yesterday and to-day when interest on the part of consumers became active again and resulted in liberal orders at 29c. for spot and 29.37½c. for quite distant future delivery. Sales yesterday amounted to 600 to 800 tons and to-day to 600 to 700 tons. Ordinarily activity such as this would be reflected in an advance in London to-day, but the contrary is true and the market is weak and lower there at £142 12s. 6d. for spot standard, £144 5s. for future standard and £145 2s. 6d. for spot Straits. Spot Straits tin is quoted here to-day at 29.25c., New York. Early last week about 100 tons in four lots of 25 tons each of Straits tin was sold on the New York Metal Exchange at prices close to 29.25c. for delivery varying from spot to May-June shipment from the East. The fairly strong position of the market on the whole is reflected in the fact that the heavy arrivals are being absorbed and that no so-called distress parcels are offered for sale. Therefore periods of dullness are regarded as temporary.

Lead.—The market continues firm and if anything a little stiffer in price. Producers are well sold for April shipment, and are not binding themselves beyond that delivery. A fair volume of business has been done by independents at 4.75c., delivered at Eastern points outside of New York. The leading interest continues to quote 4.50c., St. Louis, or 4.70c., New York, while the outside market stands firm at 4.42½c., St. Louis, or 4.75c., New York and Eastern points.

Zinc.—No improvement in demand for prime Western zinc has been reported. Prices have gradually receded in the past week to 4.65c., St. Louis, or 5c., New York, for early or April delivery, with spot metal obtainable as low as 4.62½c., St. Louis.

Antimony.—The market is stronger and wholesale lots for early delivery are quoted at 4.35c., New York, duty paid.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery, are quoted by the leading producer at 19c. to 19.10c., f.o.b. plant, depending on the quantity, and importers are offering the same grade at 17c. to 18c., New York, duty paid.

Old Metals.—Business is quiet and values generally are unchanged. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	9.50
Heavy machine composition	9.50
Brass, heavy	7.25
Brass, light	5.75
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	6.25
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

MARCH 28.—The metals are quiet, though not so dull as a week ago. Some business has developed in zinc and lead, more particularly the latter. Both copper and zinc have declined slightly, but otherwise prices of both new and old metals are unchanged. We quote in carload lots: Lake copper, 13c. to 13.25c; tin, 30.50c.; lead, 4.55c.; spelter, 4.75c.; antimony, 6c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 9.50c.; copper bottoms, 7.50c.; red brass, 7.50c.; yellow brass, 6c.; lead pipe, 3.25c.; zinc, 2c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

Request to Suspend Reduction of Ore Rates

WASHINGTON, March 28.—Request was formally filed last Saturday with the Interstate Commerce Commission by Francis B. James as counsel for Buffalo iron and steel producers that tariffs reducing ex-lake ore rates by 20 per cent, effective April 17, be suspended. Mr. James, on March 13, filed a statement with the commission on behalf of the Buffalo interests, requesting that it suspend tariffs, proposing a reduction of 28 per cent on April 1 on shipments of ores in Eastern territory. These are so-called local ores, and are covered by station-to-station rates.

The Alan Wood Iron & Steel Co. has filed a statement with the commission asking it not to suspend the tariffs proposing reductions on Eastern ores. The Alan Wood company points out that the ore used at its blast furnaces at Swedeland, Pa., originates at Port Henry, N. Y., while the Buffalo producers use Lake Superior ores almost exclusively, and can be only slightly interested in rates on so-called local ores.

New Rates to the South

PITTSBURGH, March 28.—As a result of the decision of the Interstate Commerce Commission in the Mississippi Valley rate case, rates on finished iron and steel products in the territory from Memphis, Tenn., south to New Orleans, also to Mississippi, change considerably, the new rates becoming effective April 1. The present commodity rate from Pittsburgh to New Orleans, applicable to practically all but a few products, is 51½c. per 100 lb. The new rate is 57c. The commodity rate to Memphis, which now is 42½c., advances to 43c. On tin plate the present rate to New Orleans is 53½c. and to Memphis 42c., while the new rates are 59c and 45c. respectively. Rates to other points in the affected territory are correspondingly adjusted. Woven wire fence, which has been carried in the sixth rate classification, has been put on the commodity rate and takes a rate of 57c. to New Orleans as of April 1.

Coal Added to Stock Piles

WASHINGTON, March 28.—Despite the fact that a strike on April 1 now is considered to be inevitable, demand for soft coal slackened perceptibly during the week of March 18, when production declined from 11,115,000 to 10,780,000 net tons. While there was a decrease in demand, the output so far exceeded estimated consumption as to provide nearly 2,500,000 tons to be added to consumers' stock piles, according to the Geological Survey. How much is in storage, however, will not be accurately known until the forthcoming report on stocks is issued.

INDIANAPOLIS METAL TRADES

Annual Meeting Addressed by Charles Piez and Wm. Schlake, of Chicago

Indianapolis, March 27—A program which included addresses by Charles Piez, president the Link Belt Co., consolidated, and William Schlake, president the Illinois Brick Co., and general manager of the Associated Building Contractors, Chicago, drew more than 500 men to the sixteenth annual meeting of the Indianapolis branch of the National Metal Trades Association, last Wednesday night. The addresses were preceded by a review of the conditions of the Indianapolis branch by its re-elected president, Stanley Whitworth, assistant manager of the Stutz Motor Car Co., Indianapolis, who said that the metal trades of the city were more than 90 per cent open shop. The contentment of employers and employees was the envy of other industrial centers of the country. The membership of the Indianapolis branch, he intimated, grows constantly, though slowly.

Mr. Schlake gave a vivid picture of labor conditions in Chicago and the fight that is being made by employers to better them and an impressive characterization of the labor leaders responsible for the troubles. A sample of the general situation in Chicago was given by him in his statement that the membership of the Hoisting Engineers' Association is limited to 250, although in normal building times Chicago needs 500. He said Chicago was unfortunate in having separate employers' or contractors' associations and that on account of trivial differences it had been difficult to get them to pull together. Although they finally came to a working agreement last year, it was inadequate to prevent a situation that resulted in one of them not knowing of the arbitration efforts that brought about the selection of Judge Landis until it was all over and court hearings had begun. Mr. Schlake, as the active head of one of the employers' organizations, was in touch with events after that. He recalled them for the benefit of his hearers, reading the important sections of the Landis award and describing the attitude of the various labor organizations toward it since it was made. The contempt of some of them for it finally resulted in an appeal to the citizens of Chicago by the employers' associations. Mr. Gompers was referred to by the speaker as "that evil genius who guides the destinies of organized labor." He said the fight in Chicago is now with the unions that did not join in the uniform agreement and he concluded his address by saying: "We're going to show these outlaw unions their place." The award, he said, with its eight cardinal principles, had certainly given a setback to these outlaw organizations.

Mr. Piez, who had been heard in Indianapolis before, got a rousing reception. In opening his address he said it was difficult for a red-blooded man to discuss labor conditions in Chicago without the use of profanity, but, if he used it, it would be only in the way of emphasis. He said that, following the policy pursued by the Government, he, as head of the Emergency Fleet Corporation in his relations to labor, had helped to make some of the mistakes of the war, this being due to the rules laid down as a guide to him and others by the Administration. One of the mistakes to which he thus subscribed, was that wages must keep up with the cost of living, an economic fallacy. Wages, he said, should rather be based on production. Wages have to be paid out of the output of labor, what a man does with his hands and head and not on an artificial thing like the cost of living. The eight-hour day for union labor was another thing he had advocated, during the stress of war, another fallacy for which the country had not yet recovered. The agreements thus mistakingly made with Mr. Gompers as representative, of only a small per cent of labor in those days, raised the American Federation of Labor to a pinnacle it had never dreamed of and the membership had had doubled in a few months. Mr. Gompers and his satellites are still sitting on the pinnacle of high wages, Mr. Piez said, and refuse to come down and bring back prosperity to the country, labor being the only industry that has not deflated. Organized labor continues to live in a fool's paradise. He said he had never before seen so much red ink on industry's books and it was reported the manufacturers of this ink were the only ones among all the industries making big money. Profits and dividends for others had been cut to shadows or entirely wiped out. The effort by organized labor to retain what it had gained in the war was vain, he said, and it must deflate. Organized demagogy must be met by organized resistance. The public is aroused. A citizens' committee of 179 representative men of Chicago had been formed to enforce the Landis award. These men mean business. In the worst depression the country had ever known, this committee had succeeded in collecting a fund of $3,000,000 with which to carry on the fight to compel the rebellious part of organized labor in Chicago to live up to the terms of the award of Judge Landis, an arbiter of labor's own choosing. Twenty-two unions were living up to it, but the outlaws must be driven in.

DUTY ON MAGNESITE

This and Other Features of the Tariff Bill Delay Action in Committee

WASHINGTON, March 28.—Work by the Senate Committee on Finance of completing the tariff bill is said to be almost ended. There are still a number of items of interest to the iron and steel industry which are being discussed, and it is understood that some administrative features also remain to be determined upon. Because of the uncertainty surrounding these subjects, members of the committee are unable to say definitely when the bill will be reported to the Senate. Some are hoping that this may be possible the latter part of the present week, but others seriously doubt that this can be done.

Magnesite is one of the subjects which continue to be debated and while it is claimed that the disposition of the steel schedule has been tentatively agreed upon, it is conceded that further changes may be made. As is known, manganese ore, ferroalloys, tool steel and ores required to make the latter have proved to be the most difficult problem in this schedule. Various reports are heard as to the determination of the committee on these products, but they lack verification. Among the reports circulated, however, is one to the effect that manganese ore has been placed on the free list and that ferromanganese has been given a nominal duty said to be $4.50 or $5 per ton. It is also reported that the committee has fixed a duty of 0.4c. per lb. on dead-burned magnesite and 5/16c. per lb. on crude. The House bill duties are ¾c. on dead-burned and ½c. on crude magnesite.

Prominent iron and steel manufacturers and producers of magnesite and refractories were in conference last week with members of the Finance Committee regarding proposals as to magnesite. It is said that an effort to arrange a joint conference between the iron and steel manufacturers and producers of magnesite and refractories was unavailing. Steel producers are reported to have urged a maximum duty of $5 per ton on grain magnesite and of $3.75 per ton on crude magnesite. Duties carried in the Fordney bill are ¾c. and ½c., respectively, which are equivalent to $15 and $10 per ton. The committee is said to have agreed tentatively some time ago upon duties of $10 and $7.50 per ton.

Because of the inability of steel makers and refractories interests to agree upon a compromise, the Finance Committee is reported to have turned to the Tariff Commission to check up on the costs of producing domestic magnesite and converting it into refractories. Steel producers are alleged to have made the claim that costs submitted previously to the committee were based on 1918 figures and that they are much lower to-day. The Tariff Commission is said to have made a report to the committee, but its contents have not been announced.

GERMAN MACHINE TOOL TRADE

Latest Figures Indicate a Large Decrease in That Country's Exports in 1921

There has been a considerable decrease in the volume of Germany's machine tool exports during 1921 as compared with 1920 and the prewar year 1913, according to the latest figures received by the Industrial Machinery Division of the Bureau of Foreign and Domestic Commerce.

Tables are given below showing Germany's custom house returns for the seven months May to November, 1921, and for the entire year of 1920. The figures for the first four months of 1921 have not been published as yet.

In studying these tables it should be borne in mind that the German classification of machine tools is an extremely broad one and includes metal working, wood working, and stone working machinery as well as hydraulic presses, riveting machines, and power hammers.

German Exports of Machine Tools—1921
Metric tons (2204.6 lb.)

	May	June	July	August	September	October	November	Total 7 mos.
Belgium	311.2	1,388.2	2,488.2	490.5	1,686.5	573.5	627.6	7,547.7
Denmark	73.0	102.7	125.0	94.5	136.7	98.9	150.0	780.8
Alsace-Lorraine	105.2	112.4	42.2	63.2	40.1	70.4	34.9	468.4
France	418.4	1,089.9	1,069.6	696.3	568.5	678.6	566.6	5,087.9
Great Britain	136.1	315.3	73.3	50.9	156.0	89.0	237.1	1,057.7
Italy	389.4	620.1	1,572.4	238.7	310.6	150.6	184.9	3,466.7
Netherlands	617.3	712.8	800.7	754.4	547.9	557.7	568.5	4,559.3
Norway	45.6	67.8	35.0	27.7	55.2	41.6	87.7	360.6
Austria	322.9	535.8	422.4	494.1	422.5	305.1	320.9	2,823.7
Czecho-Slovakia	198.5	206.0	270.8	212.5	205.0	336.5	367.3	1,796.6
Sweden	4.4	135.7	98.9	88.3	56.4	63.9	85.7	533.3
Switzerland	336.1	369.7	296.5	180.6	122.9	233.5	199.2	1,738.5
Spain	226.5	201.1	217.1	149.6	166.9	133.7	143.5	1,238.4
South America	184.4	221.8	181.8	185.9	208.0	341.6	259.3	1,582.8
Other countries	730.8	697.9	1,028.7	854.0	878.7	756.1	1,057.5	6,003.7
Metric tons	4,099.8	6,777.2	8,722.6	4,581.2	5,543.9	4,430.7	4,890.7	39,046.1

German Exports of Machine Tools—1920
Metric tons (2204.6 lb.)

Belgium	7,452.7
Denmark	2,806.6
Alsace-Lorraine	1,827.0
France	13,668.3
Great Britain	1,619.7
Italy	7,546.3
Netherlands	19,054.1
Norway	1,535.1
Austria	4,978.7
Czecho-Slovakia	3,360.4
Sweden	5,433.5
Switzerland	11,760.7
Spain	3,268.9
South America	2,949.4
Other countries	7,659.8
Total	94,921.2

A comparison between the pre-war and post-war returns is given below, together with details of the South American participation. The 1920 and 1921 statistics do not indicate separately the figures for Asia, Australia, Africa, North America, Central America, etc., all these being included in the item "other countries" mentioned above.

	Total, Metric Tons	South America—Metric Tons	South America—Percentage of Total
1911	64,851	4,043	6.2
1912	77,283	5,318	6.9
1913	90,279	4,869	5.4
1920	94,921	2,949	3.2
May 1 to Nov. 30, 1921	39,046	1,583	4.

Taking the above total of 39,046 metric tons applying to the seven months of 1921, and employing the same ratio for the missing months, 1921 would give a total of approximately 67,000 metric tons, indicating a substantial falling off in volume as compared with the years 1920 and 1913.

It is interesting also to observe that while Germany's total exports of machine tools during the years preceding the war show a large and steady growth, the experience after the war has been quite the reverse.

The detailed tables prove to what extent Germany is dependent on its European neighbors as customers and show that its volume of exports to other parts of the world is very much less than is commonly supposed. South American imports of German machine tools declined from 4869 metric tons for 1913 to 2949 metric tons for 1920, and an estimated total of 2700 metric tons for 1921. Furthermore, South America's percentage of participation in Germany's total was much lower during 1920 and 1921 than during the several years preceding the war.

According to a survey made by an American publishing company based on an actual census of 460 machine shops located in South America, 39.3 per cent of the machine tools in South America before the war came from the United States and only 13.4 per cent were made in Germany.

All of the above would suggest that Germany has been over-rated as a competitor of American machine tools in such markets as Latin America, Asia, and similar territories.

Tariff Changes in New Zealand and Brazil

WASHINGTON, March 28.—Pig iron and scrap, formerly carrying a general duty of 20 per cent but free when coming from the United Kingdom, now are admitted free from all sources to New Zealand. Electric machinery and equipment formerly dutiable at a general duty of 20 per cent and 10 per cent from the United Kingdom will, after May 31, be assessed 10 per cent generally and free from the United Kingdom.

These are included among important changes made in import duties of New Zealand as shown in a special report of the revised tariff of that country made to the tariff division of the Department of Commerce. The principal feature of the changes in actual rates as compared with the former tariff is the considerable extension of the system of preferential rates to British products. This has been accomplished either by rendering dutiable products from foreign countries formerly free from all sources, or by cutting the former British rates and increasing the corresponding rates on non-British goods. Most foreign products formerly free will now pay 10 per cent ad valorem. On the other hand, a limited number of items hitherto dutiable have either been reduced in rate or transferred to the free list.

The new tariff is constructed along similar lines to that of Australia, and consists of three scales of duties: General rates which apply to all foreign countries with which there is no special arrangement; preferential rates granted to goods originating in any part of the British Empire; and intermediate rates which it is proposed to apply to the products of such countries which may later enter into negotiations with New Zealand for reciprocal tariff privileges. Thus far the intermediate rates have not been called into effect. The act contains special provisions against dumping of foreign products and carries special scales for increases of the general duties up to 25 per cent against

products of countries with depreciated currencies, the amount of increased duties varying with the degree of depreciation. The special primage duty of 1 per cent ad valorem will continue to be collected on all imports, with a few exceptions.

Important tariff changes also have been made in the Brazilian Budget Law of 1922 as reported to the tariff division by Commercial Attache Schurz at Rio de Janeiro. Many classes of goods for various purposes may now be admitted into Brazil during 1922 either at reduced duties or free of all charges. Among products put on the free list are apparatus and raw materials imported by coal and gold mining companies for mining purposes, including electric machinery for supplying power to third parties when natural fuel productions are used.

BRAZILIAN INDUSTRIES

Government Follows Liberal Policy Toward Iron and Steel Manufacturers

WASHINGTON, March 28.—Ambition of the Brazilian Government to increase its economic self-sufficiency by utilizing such resuroces as it has is being realized to a greater degree, and to this end developments in the iron and steel industries have taken place during the past era. Report to this effect has been made to the Department of Commerce by Commercial Attache Schurz at Rio de Janeiro. It is stated that it is proposed not only to supply the home market with iron and steel but eventually to produce a surplus for export to other South American republics. It is declared that iron and steel manufacturers are developing rapidly in Brazil, especially in Sao Paulo. The products of the industry which are mentioned include nails, screws and bolts, chains, woven wire, fence wire, agricultural implements, enameled iron ware, rolling doors, safes, stoves, and a great variety of general foundry work.

The basis of the Brazilian industry is the vast stores of high-grade hematite and megnetite ore existing in Minas Geraes and to a lesser degree in several other States, including Sao Paulo and Parana. It has been estimated by competent geologists that the total ore content of these fields is between 6,000,000 and 12,000,000,000 tons of hematite, a very large proportion of which runs over 60 per cent iron. This is exclusive of the lesser volume of magnetite ores.

Both the present Federal Administration and the Governments of Minas and Sao Paulo have pursued a policy of encouraging the growth of an iron and steel industry. Liberal concessions have been granted to several companies, the principal favors consisting of exemption from import duties on equipment and from other taxes over a long period of years. Also, guaranties of substantial Government purchases have been given, and recently the policy has been adopted of making loans to metallurgical concerns. The aggregate of such credits opened during the past year amounted to 13,300,000 milreis.

Plans of Dominion Alloy Steel Corporation

Under the direction of leading Canadian and United States steel men a new industry is to be launched at Sarnia, Ont., to be known as the Dominion Alloy Steel Corporation. Plans for the enterprise are now well advanced. The new concern will commence construction work on a new plant to be located on the Indian Reserve, two miles south of Sarnia, where the company has an option on 1200 acres, within a few weeks. It is stated that the plant will have a capacity of 50,000 tons annually of alloy and high carbon steels for motor and allied manufacturers. The electric furnaces and general equipment will be available for production, it is expected, in seven months and the full plant will be in operation within ten months.

At present vanadium and molybdenum alloy steels, made in electric furnaces and used largely by the motor and automobile manufacturers, have to be imported from the United States. The Dominion Alloy Steel Corporation counts on being able to provide the Canadian trade with its products well under the lowest United States prices. Several large Ontario motor car companies have welcomed the advent of a Canadian concern, laying down the products for them close at hand, and the greater part of the plant's output, it is understood, has been bespoken at good prices in advance.

Financing plans include the issue of $3,500,000 of 8 per cent preferred stock, and a similar amount of common, permission for the sale of which has just been granted by the Michigan Securities Commission, as regards the portion to be underwritten in Detroit, which it is believed will be about $2,000,000. Directors themselves, will take up $500,000 of the preferred issue, and the remainder will be underwritten in Canada by a syndicate of Toronto and Montreal houses. Proceeds of the sale of the stock will be sufficient to provide for the construction of the plant, estimated to cost $3,000,000, and an adequate supply of working capital. The complete personnel of the board of directors has not been announced, but it is understood that it will include Harry R. Jones, Canton, Ohio; C. H. Wills, Detroit; J. J. Mahon and G. A. Simpson, the Steel Co. of Canada, Hamilton, Ont.; Sir William Mackenzie, Toronto, Ont.; Bert H. McCreath, Toronto; Col. William McBain, W. Wallace Jones, W. B. Boyd, Toronto.

Upper Lake Ore Rate Hearing

CHICAGO, March 25.—The hearing on Upper Lake ore rates, which was resumed after a recess of several weeks at the Great Northern Hotel, Chicago, on March 21, has been devoted principally to a discussion of transportation costs. Representatives of the complainants first offered rebuttal to Cleveland exhibit No. 133 presented by the Chicago & North Western Railroad in a previous session of the hearing. Later they introduced some new testimony, and this gave the defendants an opportunity to amplify the presentation of their case. Among those who appeared on behalf of the complainants were Jean Paul Muller, counsel for the iron ore shipping interests; G. W. Oliver, statistician for the Steel & Tube Co. of America; Robert Hula, traffic manager of that company; H. C. Crawford, the Midvale Steel & Ordnance Co., and P. C. Sprague, M. A. Hanna & Co. V. P. Turnburke, statistician for the Great Northern Railroad, and others, appeared on the behalf of the defendants.

Mr. Muller contended that the various exhibits were nothing more than expense assignments, and that there is a great deal of difference between an expense assignment and a cost study. The former, he said, is comparable to dividing the wages of the workers in a shoe factory by the number of shoes produced, and the latter to assigning the actual time spent on each shoe and the cost of it. He offered a series of rebuttal exhibits in which he sought to show that the figures originally introduced by his witnesses were improperly criticised by the railroads. In referring to the two Steel Corporation railroad lines in Minnesota, he stated that the figures for the entire year did not properly reflect the excess earnings on iron ore. He pointed out that during the ore season, May to October, 1921, the two roads earned enough net revenue to absorb the $3,275,631 deficit created during the non-ore moving months and to leave a net balance of $5,666,307.

In commenting on the Chicago & North Western exhibit, Mr. Sprague asserted that while rates on all carload freight on that railroad are 203 per cent of those effective in 1914, freight other than ore is now only 188½ per cent of 1914 level, while ore carries a rate of 221.6 per cent of the 1914 rate. Mr. Sprague's deduction was that ore is carrying a larger proportion of the increase in rates than other commodities.

One point in the North Western exhibit which was the object of particular attack, was a series of statistics tending to show that rates at the head of the lake are consistent with similar rates in the East and the South.

NEW TRADE PUBLICATIONS

Soaking Pit Cranes.—Morgan Engineering Co., Alliance, Ohio. Bulletin No. 21 contains a detailed description of the soaking pit cranes with separate illustrations of trolleys, bridges, auxiliary hoists and various capacity cranes installed in plants.

Cutting Torch.—Air Reduction Sales Co., 342 Madison Avenue, New York. A folder describing the Airco D cutting torch. Tables show the thickness of metal that may be cut, pressures necessary and gas consumption of the torch per hour.

Cranes.—Whiting Corporation, Harvey, Ill. A four-page folder with numerous illustrations of electric and hand power traveling cranes, bucket handling and gantry, jib, pillar and bracket cranes. There is also a brief, illustrated description of the crane trolleys.

Boiler Tubes.—National Tube Co., Pittsburgh. Bulletin 16 D, of 16 pages, describing the manufacture of National and Shelby boiler tubes. The illustrations show tests made upon the tubes, and there are brief quotations and extracts from standard books and papers on the subject covering slipping, expansion and holding power.

Tile.—Norton Co., Worcester, Mass. A 16-page booklet dealing with specifications and detailed instructions for installing Alundum safety tiles. Numerous sectional drawings are given, showing each step necessary in laying the tiles.

Pulverized Fuel.—Hardinge Co., 120 Broadway, New York. Catalog No. 12 of 48 pages, dealing with Quigley fuel systems, devotes considerable space to the methods of preparing, transporting and burning puverized fuel. Photographs of installations and sectional line drawings are reproduced.

Duplex Pumps.—Dean Brothers Steam Pump Works, Indianapolis, Ind. Catalog No. 17, 68 pages, illustrating and giving specifications of the entire line of pumps manufactured by this company.

Centrifugal Pumps.—Worthington Pump & Machinery Corporation, 115 Broadway, New York. Bulletin W-605, a 72-page instruction book, on type VH, Class B, BS, OE centrifugal pumps. The information covers installation, operation and maintenance, as well as a number of sectional views and temperature charts. The individual parts of each type are taken up separately and the operator instructed in the proper method of repairing. Valuable tables are included. There is an insert of plotting paper for the use of buyers in submitting sketches with inquiries.

Forgings.—Machinery Forging Co., Cleveland. Catalog, 30 pages, illustrating some of the special flat die and upset forgings and bent parts made by this company and indicating its wide range of products. The illustrations include lathe spindles, crankshafts, camshafts, bending roll forgings, boring mill heads, hooks, collets, weldless rings, gear blanks, cam forgings, composite forgings, etc.

Gas Furnace Equipment.—Surface Combustion Co., 366 Gerard Avenue, New York. Bulletin No. 3 D on surface combustion low-pressure air-gas inspirators designed to be readily applicable to any make of gas furnace.

Fans and Blowers.—New York Blower Co., Chicago. Catalog No. 80, of 72 pages, illustrates and describes Type C Seri-Vane fans, as well as planing mill exhausters, pressure blowers, propeller and disk fans, air washer pumps and motors, unit heaters, forges, ventilators, registers and diffusers. There are numerous tables of dimensions, capacities, weights, gages, etc.

Lumber.—Pacific Lumber Co. of Illinois, Chicago. An artistic compilation of the company's advertising for the coming year in trade publications appealing to lumber dealers, wood specialty manufacturers and industrial users. The advertisements are shown in reproduced pages from various business papers, and a table of magazines and their circulation figures is given.

Locomotive Cranes.—Ball Engine Co., Erie, Pa. Bulletins S-16 and S-30 describe the Erie Type B steam shovel and Type B locomotive crane respectively. The locomotive crane is shown operating on various types of work and equipped with tractor wheels, crawl treads, and for operation on rails. Specifications are tabulated and accompanied by a cross-section drawing. The Type A 13½-ton standard locomotive crane is described in an insert.

Graphic Meters.—Esterline-Angus Co., Indianapolis. Bulletin 222, being a reprint of an article by R. S. Lowry, formerly electric engineer, Newton Steel Co., on "Reducing Manufacturing Costs by Studying Power Demand."

Belt Fasteners—Bristol Co., Waterbury, Conn. Bulletin No. 713, covering steel belt lacing and illustrating each step in the fastening of a belt.

Blowers.—Sterling Blower Co., Hartford, Conn. A 36-page booklet, No. 122, covering blowers and blower systems, with illustrations, descriptions and tables. A ball-bearing exhauster of the cast-iron type is featured as an innovation.

Pulverized Coal.—Bonnot Co., Canton, Ohio. Bulletin 62, presenting 10 advantages of using pulverized coal under the Holbeck system for melting iron. These 10 points are listed with explanations following.

Sparks is the title of a new house organ, the first issue of which was recently published by the Bastian-Blessing Co., 125 West Austin Avenue, Chicago, safety devices, carbonizers, etc. In its present form it is a three-page folder 4 x 9 in., containing line drawings and photographs of the company's products.

Die Castings.—Alemite Die Casting & Mfg. Co., Chicago, Catalog No. 5. Devoted to the economic and practical advantages derived through use of the Alemite process of die casting in making parts for a wide variety of mechanical purposes. The general principles of the process are taken up, the illustrations being of the company's plant and of the various products such as parts for electrical tools, automobiles, motion picture machines, phonographs and other parts. Size 6 x 9, 70 pages.

Exhausters and Blowers.—Sterling Blower Co., Hartford, Conn. Catalog No. 122, 6 x 9 in., 36 pages, describes, with numerous illustrations, slow speed, steel plate, single and double exhausters for use in blower systems. The double exhauster is intended to handle material of two kinds without mixing. Other steel plate exhausters described include those direct connected to an electric motor and to steam turbines. There are schedules of dimensions and tables of capacities, with details of bearings and wheels. Volume type exhausters are illustrated, accompanied by tables of dimensions and capacities. A unit for separating light material from heavy is shown as well as propeller fans with various types of drive, dust collectors, standard and special, dust arresters, exhaust heads, stationary ventilators and automatic furnace feeders used in connection with the company's exhaust systems.

New Books Received

The Journal of the Institute of Metals. Vol. 26, 1921, pages 760, 5½ x 8¼ in.; illustrated. Published by the Institute of Metals, 36 Victoria Street, S. W. 1, London.

The Journal of the Iron and Steel Institute. Vol. 104, pages 466, 5¼ x 8¼ in.; illustrated. Published by the Institute, 28 Victoria Street, London, S. W. 1, and by Spon & Chamberlain, 123 Liberty Street, New York.

Commercial Statistics for the Calendar Year 1920. Annual report of the Chief of Engineers, 1921. Pages 1434, 5¾ x 9 in. Published by Government Printing Office, Washington.

History of the Southern Pacific. By Stuart Daggett, Ph.D. Pages 470, 5¾ x 8¼ in.; illustrated. Published by the Ronald Press Co., 20 Vesey Street, New York. Price $5.

Weights and Measures.—Report of the fourteenth annual conference on weights and measures, Washington, May, 1921. Pages 132, 7 x 10 in.; illustrated. Published by Government Printing Office, Washington. Price 20 cents.

Milling Cutters and Milling. Pages 69, 5 x 7½ in.; illustrations, 34. Published by National Twist Drill & Tool Co., Detroit. Price, $1.

Materials of Construction. By the late Prof. Adelbert P. Mills, Cornell University, and Prof. Harrison W. Hayward, Massachusetts Institute of Technology. Pages 476, 6 x 9 in.; illustrations, 192. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $4.

Jigs and Fixtures. By Albert A. Dowd and Frank W. Curtis. Pages, 293, 5¾ x 9 in.; illustrations, 232. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Quin's Metal Handbook and Statistics 1922. Compiled by L. H. Quin. Pages 281, 4¼ x 6¼ in. Published by the Metal Information Bureau, Ltd., 7 East India Avenue, London, E. C. 3, England.

Blue Book of Southern Progress, being a compendium of industrial statistics of the South. Pages 120, 6 x 9 in. Published by *Manufacturers Record*, Baltimore. Price, 50c.

Machinery Markets and News of the Works

MARCH BRINGS IMPROVEMENT

More Business Is Being Placed This Month in Machine Tools

General Machinery, Including Electrical and Slag Crushing Equipment and Cranes, Picks Up

A more notable improvement in general machinery lines is indicated by the week's reports. While machine-tool trade has improved slightly in some markets, the aggregate volume makes a better showing only by comparison with what has been done and not with what should be done to keep plants reasonably busy.

In general machinery lines, it is noted that orders and inquiries for cranes have improved. In the Pittsburgh district, particularly, there is a much better demand for this class of equipment. An inquiry from China for 10 cranes, among which is one of 120-ton capacity, is being figured on by crane builders.

Electrical equipment is in better demand. Conspicuous among recent orders is one received by the Westinghouse Electric & Mfg. Co. for $1,500,000 worth of equipment for the Southern California Edison Co. Slag crushing equipment for the new plants of the National Tube Co., Lorain, Ohio, and the Standard Slag Co., Bellaire, Ohio, has been placed, the beneficiaries in this business being the Traylor Engineering Co., Allentown, Pa., the Jeffrey Mfg. Co., Columbus, Ohio, and the Allis-Chalmers Mfg. Co., Milwaukee, Wis. In foundry equipment, the order of the Ford Motor Co., Detroit, for nine No. 8 cupolas placed with the Whiting Corporation stands out.

Some orders for machine tools which were expected in the past week have been temporarily held up pending the outcome of the coal strike.

In Chicago orders have been placed for tools by several companies whose shops were damaged in the recent disastrous fire. The U. & J. Carburetor Co., whose plant was wrecked, has issued an extensive list of equipment it will buy. The W. J. Pine Co., Kenosha, Wis., has issued a small list, but desires to trade used equipment. The Santa Fe Railroad has issued an additional inquiry covering a driving wheel lathe, car axle lathe, car wheel press, 4 ft. radial drill and a 300-lb. hammer.

The Boston public schools took bids last week on 15 machine tools. The Bangor & Aroostook Railroad has placed orders in Boston for several tools, and the Boston Elevated has also bought in a small way. The Lamson Co., Boston, has bought several plate fabricating machines. A Providence, R. I., manufacturer has issued a list, including four or five radial drills.

A better demand for turret lathes has featured the Cleveland market. Dodge Brothers, Detroit, bought eight and the Hudson Motor Car Co. bought two. More orders for turret lathes have been booked this month by a leading Cleveland manufacturer than in any month for a year. The Cleveland Board of Education is inquiring for 30 machine tools, woodworking and sheet metal working machines.

Recent price changes include a cut of 30 per cent on lathes from 27 to 60 in. by the Pittsburgh Machine Tool Co., Pittsburgh, and a 10 per cent reduction by the National Automatic Tool Co., Richmond, Ind., on multiple spindle drilling machines.

New York

NEW YORK, March 28.

Another dull week in the local machine-tool trade has brought no indication of a turn for the better. A very small volume of business is being done and orders are mostly confined to single tools. Some dealers and manufacturers' sales offices report a slight improvement, but it is by no means general. The general dullness is indicated by the fact that some local offices have gone a whole month without a single order, except possibly for repair parts. Prospects are not numerous and large inquiries are conspicuously lacking.

The recent increase in activity in the crane market continues. A few new inquiries are reported, but most of these are for small 1-ton, 2-ton, 3-ton and 5-ton electric cranes. But little purchasing of hand power cranes is reported, although a good business is being done in chain hoists ranging up to 4-tons capacity. One of the large current inquiries is for export to China, probably for the Shantung Railroad, and calls for 10 electric traveling cranes for railroad shops. They include one 120-ton, 61-ft. span overhead traveling crane, equipped with hoists and slings for lifting locomotives; two 10-ton, 61-ft. span; two 7-ton, 48-ft. span; three 5-ton, 48-ft. span; and two 5-ton, 61-ft. span. The Foundation Co., 120 Liberty Street, New York, has asked for bids on a 25-ton, 1-motor, overhead traveling crane for the Cumberland County Power & Light Co., Portland, Me. The Advance Boiler Co., 1480 Broadway, New York, is inquiring for a 1-ton, 33-ft. span, 3-motor, overhead traveling crane. The Watson Machine Co., Paterson, N. J., has been receiving bids and will close shortly for a 15-ton, 40-ft. span, overhead traveling crane.

Among recent sales were: Cleveland Tramrail Co., a 2-ton, about 1000-ft. tramrail to the American Steel & Wire Co. and a 2-ton, about 500-ft. tramrail to the Frank Scolaro Marble Co., New York; Shepard Electric Crane & Hoist Co., a 5-ton, 54-ft. span, 3-motor overhead traveling crane to H. B. Smith & Co., Westfield, Mass., and a 5-ton, 33-ft. span, overhead traveling crane to the Haverstraw Electric Co., Haverstraw, N. Y.; Shaw Electric Crane Co., two 10-ton, 90-ft. span, overhead traveling cranes to the American Car & Foundry Co., and the Osgood Co., Marion, Ohio, a No. 18 steam shovel, about 10 to 12-tons capacity, to Sanderson & Porter, New York, who were negotiating for a locomotive crane.

The Superintendent of Lighthouses, Staten Island, N. Y., will take bids until April 3 for a three-story, reinforced-concrete addition to the machine shop at the General Lighthouse Depot, Tompkinsville, S. I.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, will take bids at once for a new two-story, steam-operated power plant, 79 x 130 ft., on Wakeman Place, to cost about $300,000.

The Underpinning & Foundation Co., 290 Broadway, New York, has filed plans for a new two-story works, 200 x 200 ft., on property recently acquired, estimated to cost $200,000. It will be equipped for the manufacture of special tools and instruments. Francis Pruyn, company address, is architect.

A vocational department will be installed in the new high school to be erected by the Board of Education, town of Islip, L.I., estimated to cost $200,000. Edward Hahn, Hempstead Bank Building, Hempstead, L. I., is architect.

The Victor Saw Works, Middletown, N. Y., manufacturer of hack saws, etc., will concentrate operations in the future at its local plant, which has been extended to accommodate machinery formerly used at the works at Springfield, Mass. The latter plant will be discontinued and the property placed on the market.

Gustave E. Walter, 157 East Forty-fourth Street, New York, manufacturer of lighting fixtures and equipment, has leased the three and four-story factory at 303 East Forty-

fourth Street, extending through to 302 East Forty-fifth Street, for a new plant. The present works will be removed to this location.

The plant of the Bamberg Dry Dock & Repair Co., Pioneer and Imlay streets, Brooklyn, comprising machine shops, forge shop and wood-working plant, will be sold by Oliver C. Garvin, trustee in bankruptcy.

The Municipal Gas Co., Albany, N. Y., will increase the capacity of its steam-operated electric power plant from 20,000 to 43,000 hp. The company is disposing of a bond issue of $2,000,000, of which about $950,000 will be used for electric plant and system extensions and improvements.

The Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has plans under way for a new building, 50 x 200 ft., at its branch plant, Sterling, Ill., estimated to cost about $50,000. It is also considering the erection of a new rod mill at this location.

The General American Tank Car Corporation, 17 Battery Place, New York, manufacturer of railroad tank cars and other railroad equipment, has disposed of a preferred stock issue of $2,500,000, the proceeds to be used for plant extensions and improvements. The company operates works at East Chicago, Ind.; Warren, Ohio; and Sand Springs, Okla.

Merkel Brothers, Sutphin Boulevard, Jamaica, L. I., will commence the immediate erection of a two-story cold storage and refrigerating plant, 60 x 75 ft., to cost about $75,000 with equipment.

Officials of the Mexican Petroleum Co., 120 Broadway, the Transcontinental Oil Co., 576 Fifth Avenue, the Mexican Sinclair Oil Co. of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, the Texas Co., 17 Battery Place, and the Atlantic Refining Co., 291 Broadway, all of New York, are organizing a joint company to operate oil properties in Mexico on a large consolidated scale, to include a central oil refining plant.

The Jerome Avenue and 172d Street Garage Corporation, care of Dunnigan & Crumley, 394 East 150th Street, New York, architects, will build a one-story automobile repair, service and storage building, with capacity of 200 cars, on property recently acquired on Jerome Avenue. Joseph M. Levine is president.

The Long Island Lighting Co., 50 Church Street, New York, has acquired the plants and properties of the Southold Lighting Co., Southold, L. I.; Riverhead Electric Light Co., Riverhead, L. I.; and the Consumers Gas Co., and will merge the interests with its system. A number of extensions and improvements will be made in the plants, as well as in the generating plant of the purchasing company. About $1,000,000 is available for the expansion.

The General Oil Co., 31 Nassau Street, New York, is being reorganized as the General Petroleum Co., with capital of $1,000,000. Following financing, it is proposed to extend and improve the oil refinery and properties in the vicinity of Houston, Tex.

W. H. Miner, Chazy, N. Y., is planning for the erection of a new electric power plant for local service, estimated to cost about $50,000.

Leo Tesser, Hillcrest Avenue, Jamaica, L. I., will commence the immediate erection of a new two-story refrigerating plant, 25 x 100 ft., on Ninety-fourth Avenue, Jamaica. Irving Fenichel, 583 Bedford Avenue, Brooklyn, is architect.

The Lehigh Valley Railroad Co., 143 Liberty Street, New York, has awarded a contract to the Henry Steers Co., 17 Battery Place, for a new one-story shop and electric substation at foot of Chapel Avenue, Jersey City, N. J., estimated to cost about $150,000.

The Duffney Brick Co., Mechanicsville, N. Y., is planning for the installation of new pressed brick manufacturing machinery and other equipment at its plant.

The Common Council, Lodi, N. J., is planning for the installation of electrically operated turbine pumps at the waterworks pumping plant.

Fire, March 20, destroyed a portion of the plant of the Carborundum Co., Keasbey, near Perth Amboy, N. J., devoted to the manufacture of refractory products, with loss estimated at about $50,000, including buildings and equipment. The destroyed structures comprised only a portion of the works, and it is undecided if they will be rebuilt. Headquarters of the company are at Niagara Falls, N. Y. F. J. Tone is president.

A vocational training department will be installed in the addition to be built at the Evergreen School by the Board of Education, Plainfield, N. J., estimated to cost $115,000.

The equipment and business of the Bergenfield Machine & Pump Co., Bergenfield, N. J., has been acquired by new interests. The plant will be removed to Belleville, N. J., and operations resumed for the manufacture of automobile pumps and kindred equipment.

Fire, March 18, destroyed the plant of the Western Cartridge Co., Little Falls, N. J., with loss estimated at about $100,000. Practically all of the machinery at the plant was wrecked. C. A. Munger is manager.

The Central Ice & Cold Storage Co., Vineland, N. J., will commence the immediate erection of a new ice-manufacturing and cold storage plant to cost about $300,000, including machinery.

The plant and equipment of the Universal Tool Co., Garwood, N. J., will be sold by the receiver in bankruptcy.

Freight-handling and conveying machinery will be installed in the municipal warehouse to be established at the city dock by the Board of Aldermen, Perth Amboy, N. J. A present building now on the site will be acquired, remodeled and equipped for the purpose.

The Passaic Valley Sewerage Commissioners, 128 Market Street, Newark, N. J., will receive bids until April 18 for work in connection with Section 2, Outfall Pressure Tunnel at Jersey City and New York Bay, to include 160,000 lb. of cast iron floor plates, wall castings, pipe specials, etc.; two sets of 66-in. gate valves, with geared stands, etc.; five 4-in. gate valves, and 65,000 lb. of steel reinforcement for concrete. J. Ralph Van Duyne is chief engineer; Joseph H. Quigg is clerk.

The Rare Metal Products Co., Bloomfield Avenue, Glen Ridge, N. J., has disposed of its local plant to the Matchless Metal Products Co. It consists of a three-story factory, with power house, on a tract of about 2½ acres.

The machine shops and equipment of the Browning, Sommer, Adams Co., Twenty-second Street and Third Avenue, College Point, L. I., will be sold at a foreclosure sale April 11, including engine and precision lathes, speed and bench lathes, screw machines and turret lathes, drilling and boring machines, planers and shapers, etc., invoiced at $500,000, with buildings and real estate.

Chicago

CHICAGO, March 27.

The local machine tool market remains quiet, although slight improvement in inquiries and orders is reported by dealers. Some of the companies which were burned out in the fire at Clinton Street and Jackson Boulevard, have bought a few tools and there is considerable business from this source still pending. The U. & J. Carburetor Co., temporary headquarters 510 West Van Buren Street, is making arrangements to secure a factory location and to resume production as soon as possible. It proposes to purchase used machinery wherever it can be bought to advantage and has sent out an extensive list of equipment, including engine lathes, heavy duty single spindle drills, No. 4 Bardons & Oliver turret lathes, size "O" Brown & Sharpe automatic screw machines, single and multiple-spindle Avery drills, both heavy duty and high speed presses, punch presses equivalent in size to No. 1 Walsh up to Loshbaugh-Jordon No. 4, a disk grinder and wheel press, smaller shapers, Leland Gifford four-spindle high speed drill presses, Cincinnati milling machines, No. 4 and No. 1 Foster hand screw machines, a ⅞-in. Gridley automatic screw machine, a Rockford single-spindle heavy duty press, 16-in. arbor presses, air compressors, a No. 2 high speed riveting hammer, a Taylor spot welder.

The W. J. Pine Machine Co., manufacturer of spring bed and special wire forming machinery, 411-415 Jenne Street, Kenosha, Wis., desires to trade in its present equipment on the following new tools: One 30-in. x 8-ft. planer, one 24-in. x 6-ft. planer, one 2-in. hand screw machine, one No. 2 milling machine, one 24-in. shaper, one universal grinding machine, one 12-in. x 4-ft. engine lathe, two 14-in. x 6-ft. engine lathes, one 16-in. x 6-ft. engine lathe, one 20-in. x 8-ft. engine lathe, one drill grinder, and one 24-in. power feed drill.

The Santa Fe has put out the following additional inquiries. One heavy duty double end car axle lathe with motor drive, one 90-in. motor-driven driving wheel lathe, one wheel press, one 4 ft. radial drill and one 300-lb. Beaudry hammer.

The Ford Motor Co. has placed an order for nine No. 8 cupolas with the Whiting Corporation, Harvey, Ill. The Whiting company has received an order for a No. 9 cupola and a 10-ton, 5-ton and 2-ton crane from the Coshocton Iron Co., Monongahela City, Pa.

The Wilt Trunk Co., 1142 Moore Street, Chicago, recently incorporated with $25,000 capital stock, will manufacture trunks and traveling equipment. It has a plant at the above address and for the present has sufficient equipment for its operations. The officers are Colin D. Wilt, president, Robert L. Wilt, secretary, and Charles T. Wilt, treasurer.

The L. W. Smith Co., manufacturer of jewelry, 320 North

May Street, Chicago, has purchased the southeast corner of Lake Street and Kilbourne Avenue, and is erecting a one-story plant, 100 x 150 ft. The land and building represent an investment of $50,000.

Holton, Seelye & Co., builders, 140 South Dearborn Street, Chicago, will erect a one-story machine shop, 50 x 80 ft., at 9164-68 South Chicago Avenue, to cost $11,000.

The Champion Pneumatic Machinery Co., 1402 South Michigan Boulevard, Chicago, has bought a factory site, 150 x 184 ft., at South Chicago and Bennett avenues.

Chester Overmyer has purchased the interest of his partner in the White-Overmyer Mold & Machine Co., Winchester, Ind.

The H. W. Johns-Manville Co., New York, has resumed the construction of its $3,000,000 plant at Waukegan, Ill. The erection of the plant was stopped more than a year ago on account of the business depression.

The Galva Heater Co., Kewanee, Ill., has been sold to C. H. Lyford, J. H. Boyd, Randolph Boyd, and Miss Anna J. Anderson. The new organization will continue to manufacture steam and hot water boilers.

The Schaynen Mfg. Co., has been incorporated in Kansas with $50,000 capital stock and plans to have factories at Topeka and Kansas City to manufacture the Eagle thermo fire and refrigerator control. The officers include; President, George W. Seitz, Salina, Kan.; first vice-president, E. C. Hayes, Topeka; second vice-president, R. D. Teasley, Topeka; secretary, W. R. Walker, Topeka, and treasurer, J. C. Baughman, Los Angeles, Cal.

The Hurley Machine Co., Chicago, is reported to be looking for a site in Los Angeles, Cal., for the construction of a branch plant.

C. Weiti, 518 Hamilton Street, Peoria, Ill., is preparing plans for a one-story garage and repair shop, 70 x 120 ft., to cost $40,000.

Henry Newgard & Co., 947-55 West Washington Street, Chicago, manufacturers of electrical specialties, and operating an electrical contracting business, have completed plans for a new one-story plant, 120 x 180 ft., at 4603-19 Fullerton Avenue, to cost about $75,000, with equipment. C. A. Eckstrom, 5 North La Salle Street, is architect.

John Klemm, 1324 East Grand Avenue, Des Moines, Iowa, has awarded a contract to J. A. Tusant & Sons Co., 330 Third Street, S. W., for the erection of a one-story and basement automobile machine and repair shop, 66 x 85 ft., at 1406-10 West Grand Street. Work will be commenced at once.

The Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, has arranged for a fund of $5,000,000 for plant and system extensions and improvements during the present year, to be followed by an additional expenditure of about $15,000,000 for ultimate expansion. The immediate work will include the erection of a new central generating plant at Waukegan, Ill., estimated to cost about $3,000,000, complete; new power house at Cicero, to cost $140,000, and smaller power houses and additions, also new transmission lines.

A vocational department will be installed in the two-story high school to be erected at Clarkfield, Minn., to cost about $100,000, plans for which are being completed by Prims & Foss, Palade Building, Minneapolis, Minn., architects.

The Central Illinois Public Service Co., Mattoon, Ill., has plans under way for a steam-operated electric generating plant in the coal fields district in southern Illinois. The company is a subsidiary of the Middle West Utilities Co., 72 West Adams Street, Chicago.

The Barrett-Cravens Co., 169-73 North Ann Street, Chicago, manufacturer of lift trucks and other material handling equipment, has acquired the four-story building at 1328 West Monroe Street, and will remove to this location in about 60 days. Approximately $100,000 was given for the property.

A vocational department will be installed in the two-story high school, 77 x 169 ft., to be erected at Alliance, Neb., estimated to cost about $175,000. Fiske & Meginnis, 533 Bankers' Life Building, Lincoln, Neb., are architects.

The Rath Packing Co., Waterloo, Iowa, will soon take bids for a one-story power house. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects.

New England

BOSTON, March 27.

Bids were asked last week by the Board of Education, Boston, on 15 machine tools, by far the largest list made public the past fortnight. Purchases will be made at once as delivery is for April 1. The list includes one Smith & Mills No. 16 shaper with necessary equipment; one Washburn U. S. Tool Co. 14 in. sensitive drill; one Star power hack saw; one J. G. Blount 14-in. wet grinder; one No. 4 Cataract bench lathe; one No. 1 Stewart oven gas furnace with blower; one 24-in. x 24-in. x 6 ft. Gray or rebuilt planer; one Becker model vertical milling machine; one Imperial combination welding and cutting outfit with 15-lb. generator with truck; one No. 3 Greenerd arbor press; one Dunmore center grinder; one 14 in. x 6 ft. Reed engine lathe, with taper attachment; one No. 1 Universal milling machine of Brown & Sharpe type; one No. 13 Brown & Sharpe universal and tool grinder, and one bench lathe. Tools equivalent to those specified are acceptable.

More business was placed in this district the past week than in the previous week, but as a rule small equipment was involved. The Bangor & Aroostock Railroad purchased a pedestal miller, a pipe bender, hydraulic bushing press, and a 6-in. pipe machine; an electrical appliance manufacturer bought a sensitive drill, a small squaring shear and five hand punches for a local service station; the Boston Elevated Railway closed on a few small tools, including a bench lathe; and several other interests one or more small pieces of equipment. A few machine tools have changed hands, however, including a pipe machine for a woolen mill interest; a motor-driven high speed drill and a power press for a nearby manufacturer of radio equipment, and three Consolidated presses each for Providence, R. I., and Cambridge, Mass., manufacturers. The Lamson Co., Boston, bought several Southwark plate fabricating tools.

The most live inquiry at the moment is for four or five radial drills, lathe and other shop equipment by a Providence manufacturer. A Massachusetts municipal lighting company is asking bids on four tools, the most important being a gap lathe.

The textile labor situation in New England has held up considerable machine tool business, but a considerable volume remains under cover which it is anticipated will shortly be closed. Competition between new and used tool dealers continues keen and prices are very reasonable. There appears to be a more concerted movement among representativs of machin tool builders, however, to convince buyers that prices are on bottom.

The W. J. Murdock Co., radio apparatus, has purchased property on Washington Avenue., Chelsea, Mass., comprising three buildings and about 90,000 ft. of land. Initial production will start with about 100 employees.

The Bureau of Yards and Docks, Washington, is asking bids on coal handling equipment for the Charlestown, Boston, Navy Yard.

The Nash Carriage Co., 841 Massachusetts Ave., Roxbury, Boston, contemplates the erection of a one-story, 107 x 114 ft. manufacturing plant.

The Pittsfield Welding Co., 154 Fenn street., will build a one-story service station at 23 Taylor Street, to cost $13,000. Emack & Hicks are the proprietors.

Bids are in on a vocational school, two-stories, 90 x 140 ft., contemplated by the town of Southbridge, Mass. Appleton & Stearns, 53 State Street, Boston, are the architects.

Landers, Frary & Clark, manufacturers of hardware, cutlery and electrical appliances, New Britain, Conn., have rejected all bids for their proposed six-story addition, and will postpone the project for the present.

The Narragansett Electric Light Co., Providence, R. I., has issued a call for bids for the erection of its new plant to consist of a one and two-story power house, 40 x 56 ft.; three-story light storage building, 101 x 222 ft.; and one-story heavy storage building, 120 x 222 ft., to be equipped with two electric traveling cranes; automobile repair and service building, 114 x 172 ft., and other structures. Jenks & Ballou, 1035 Grosvenor Building, are engineers.

The Amoskeag Mfg. Co., Manchester, N. H., is planning for a new hydroelectric generating plant at Mooars Falls, near Merrimack, N. H., to cost about $2,000,000. The Town Council, Merrimack, has granted the company tax exemption for 10 years to insure the erection of the plant.

The Springfield Blower Co., Springfield, Mass., manufacturer of mechanical draft equipment, is planning the erection of a one and two-story addition.

A one-story power house will be erected by the Fuller Brush Co., 547 Asylum Street, Hartford, Conn., in connection with its new four-story plant, 80 x 400 ft. Buck & Sheldon, Inc., 60 Prospect Street, is architect.

The Gilbert & Barker Mfg. Co., Springfield, Mass., manufacturer of pumps, oil storage equipment, etc., has awarded contract to the Ernest F. Carlson Co., 244 Main Street, for a one-story foundry.

The Lowell Electric Light Co., Lowell, Mass., will issue stock for $297,200, for extensions and improvements to power plant and system.

The Boston & Maine Railroad Co., North Station, Boston, is having plans prepared for a one-story car repair shop at East Cambridge, Mass. A. C. Corthell is engineer.

The Donnelly Taxi Motor Service, Inc., Providence, R. I., will build a new automobile service and repair works at Chestnut and Friendship streets.

The Waterville Motor Co., Waterville, Me., is having plans prepared for a two-story and basement service and repair works, 52 x 65 ft., on Bangor Street, Augusta, Me. Horace T. Muzzy, 173 Main Street, Waterville, is architect.

Pittsburgh

PITTSBURGH, March 27.

Recent activity in cranes in this district is well maintained. In the past week the Coshocton Iron Co., Monongahela City, Pa., placed an order with the Whiting Corporation, Harvey, Ill., through its Pittsburgh office, for one 10-ton, one 5-ton and one 2-ton crane. The Cleveland Crane & Engineering Co., Wickliffe, Ohio, through its Pittsburgh office, has taken a 5-ton overhead for the recently organized Structural Steel Co., the Griffith-Custer Steel Co., Johnstown, Pa., and a 2-ton jib crane for the Sabraton works, American Sheet & Tin Plate Co., Morgantown, W. Va. Action is expected this week on the 110-ton crane recently inquired for by the West Penn Power Co., in connection with the enlargement of its Windsor, W. Va., power plant, and it is currently reported that the 10-ton cranes recently inquired for by the Pittsburgh Supply Co., Ross Street, Pittsburgh, are about to be let.

The prospective list still is extensive and includes several inquiries from steel companies and, because of the recent improvement in the steel business and the enlarged plant operations, there is a belief that orders will be more numerous than recently. Sentiment among representatives of crane builders is much more hopeful than it has been in more than a year; the one unfavorable feature of the situation at the moment is that competition for orders still is sharp and some very low prices are being made. At that, however, some are letting orders slip rather than meet the lowest quotations.

A better feeling also exists in the machine-tool trade, although fairly frequent lists of used machines, some of which are really extensive, as was one recently issued by the Westinghouse Electric & Mfg. Co., have a tendency to dampen the ardor of those expecting an early betterment in business. On the constructive side, however, it can be reported that the Wheeling Steel Corporation has issued a new list of six or seven tools, including shapers, milling machines and lathes for its Martins Ferry, Ohio, and Wheeling, W. Va., plants and the fact that local manufacturers of railroad equipment lately have been in receipt of some fairly good orders is expected to provoke inquiries from that source or revive some inquiries put out about two years ago, but which have been dormant. The Somers, Fittler & Todd Co. has had a good week, having lately disposed of a 48-in. Fay & Egan triple drum sander to a nearby lumber company; a Niagara power press, an automatic surface grinder, a drill press and a saw to another buyer, and a high-speed ball-bearing drill, this latter tool out of stock. The H. J. Heinz Co., Pittsburgh, is reported in the market for a lathe and drill press, while the Standard Sanitary Mfg. Co., has inquired for a 60-in. open-side planer. The most interesting price announcement of the week is that of the Pittsburgh Machine Tool Co., which has made a reduction, effective immediately, of 30 per cent in its heavy duty lathes of from 27 in. to and including 60-in tools.

The market reflects more activity in electrical and other equipment. The Westinghouse Electric & Mfg. Co. has taken an order for the electrical equipment for a new power house for the Southern California Edison Co., which amounts to $1,500,000 and includes three vertical waterwheel generator units, seven high voltage transformers, six high voltage automatic transformers and 24 high tension circuit breakers, together with miscellaneous auxiliary and switch equipment. The Traylor Engineering Co., Allentown, Pa., and the Jeffrey Mfg. Co., Columbus, Ohio, share in the contract for the crushing equipment for a new slag plant for the Lorain, Ohio, works of the National Tube Co., while the Allis-Chalmers Mfg. Co., has taken the order for the crushing and electrical equipment for a new slag plant for the Standard Slag Co., Bellaire, Ohio. The Allis-Chalmers Mfg. Co. also has taken an order for a 4000-kw. non-condensing turbo alternator for the Gulf Refining Co., for installation at its refinery at Port Arthur, Tex. This is a duplicate of one installed in the same plant two years ago. The exhaust steam from these units is used in process work. The borough of Homestead, Pa., has authorized the taking of bids on a 4,000,000-gal. pump for its new waterworks; John M. Rice, Oliver Building, Pittsburgh, is the consulting engineer for this project.

The Harris Pump & Supply Co., 320 Second Avenue, Pittsburgh, manufacturer of pumps, valves, etc., has leased six floors of the eight-story building at 316-18 Second Avenue, for new works. The other two floors have been leased by the American Radiator Co.

The Keystone Power Co., Kane, Pa., is disposing of a bond issue of $1,750,000, a portion of the proceeds to be used for extensions and improvements in electric power plants and system and for the installation of additional machinery. N. M. Argabrite is vice-president.

The Libbey-Owens Sheet Glass Co., Nicholas Building, Toledo, Ohio, will commence the immediate erection of a one-story addition to the power house, 65 x 75 ft., at its Charleston, W. Va., plant, to cost about $50,000. It is also planning for extensions and improvements in the local works to bring the expenditure to about $200,000, including equipment.

The Virginia & Pittsburgh Coal Co., Fairmont, W. Va., will electrify its entire Kingmont plant in the Fairmont district, and will install electric pumping, hoisting and other equipment. Central station power will be used.

The American Gas & Electric Co., 30 Church Street, New York, will commence the immediate erection of a one-story addition to its power plant at West Springdale, W. Va., 100 x 200 ft., estimated to cost about $1,000,000, with transmission lines and other work in this district. Sanderson & Porter, 62 William Street, New York, are engineers.

The Rubber Production Co., Morgantown, W. Va., has taken over the local plant of the Armorcord Rubber Co., closed for about a year, and will operate it for the manufacture of automobile tires and other rubber products.

The American Car & Foundry Co., 165 Broadway, New York, has awarded a contract for foundation and other work for a brick and steel addition to its plant at Huntington, W. Va., to the Langhorne & Langhorne Co., Fourth Street, Huntington, to cost about $500,000 including equipment. J. W. Ensign is district manager.

Philadelphia

PHILADELPHIA, March 27.

The Pennsylvania Equipment Co., 1420 Chestnut Street, Philadelphia, is in the market for a second-hand, modern, standard-gage, 50-ton Shay geared locomotive.

The Liberman Manufacturing Co., Seventeenth and Vine streets, Philadelphia, manufacturer of cigar-making machinery, has acquired the factory property at Twentieth Street and Allegheny Avenue, 63 x 225 ft., for a new plant. It is understood that the present plant will be removed to the new location.

The Board of Works, City Hall, Philadelphia, is planning for the early erection of a one-story machine shop, 100 x 280 ft., at Cambria and Twenty-eighth streets, for municipal service, estimated to cost about $75,000. F. H. Caven is director. A. E. Davis, City Hall, is engineer.

The Equipment Mfg. & Supply Co., 26 North Fifth Street, Philadelphia, manufacturer of tools, mechanical equipment, etc., has leased the building at 228 Church Street for a new plant.

The William Cramp & Sons Ship & Engine Building Co., Richmond and Norris streets, Philadelphia, has acquired the plant and business of the Pelton Water Wheel Co., Nineteenth Street, San Francisco, manufacturer of water turbines. It will be operated as a subsidiary, retaining the present name. H. B. Taylor, vice-president of the purchasing company, will be president of the Pelton organization.

M. Moister & Co., 3931 North Fifth Street, Philadelphia, manufacturers of metal and wood portable buildings, are arranging for a new one-story plant, 50 x 175 ft., at American and Bristol streets, to cost about $35,000. Complete metal-working and wood-working departments will be provided.

A one-story power house will be erected by the Collins & Aikman Co., 4675 Nixon Street, Philadelphia, for its textile mill.

The Liberty Can & Sign Co., Water and Marion streets, Lancaster, Pa., has awarded contract to Herman Wohlson, Woolworth Building, for a two and four-story addition, 42 x 49 ft., and 28 x 30 ft., respectively. J. C. Gibbs is in charge.

Fire, March 22, destroyed the vocational high school at West Lampeter, near Lancaster, Pa., with loss estimated at about $50,000. It will be rebuilt.

The Seaboard & Inland Oil Corporation, Bloomsburg, Pa., is planning for the construction of a new plant at Milton, Pa. J. W. Bruner is president.

The Sunbury Water Co., Sunbury, Pa., is having plans prepared for a one-story power house, 50 x 50 ft. William H. Dechant, 632 Washington Street, Reading, Pa., is engineer.

The Defiance Auto Lock Corporation, Allentown, Pa., will install a number of new machine tools at its plant, including lathe, milling machine, etc.

The Frick Co., Waynesboro, Pa., manufacturer of agricultural machinery and implements, will build a new foundry with a capacity of about 60 tons of castings per day. The old foundry will be demolished upon the completion of the new building, and the site used for the construction of an addition to the machine shops.

A vocational department will be installed in the new high

school to be erected by the District School Board, Conshohocken, Pa., bids for which will be asked at an early date by Henry L. Reinhold, Jr., 1513 Walnut Street, Philadelphia, architect.

A vocational department will be installed in the three-story high school, 90 x 150 ft., to be erected at Carbondale, Pa., at a cost of $250,000, preliminary plans for which are being drawn by John J. Howley, Traders' Bank Building, Scranton, Pa., architect.

The Armstrong Cork Co., Liberty and Mary streets, Lancaster, Pa., will soon break ground for a four and six-story addition, 50 x 215 ft.

The Citizens' Ice Co., Allentown, Pa., recently organized, will build a new ice-manufacturing and cold storage plant at Fifteenth Street and the Lehigh Valley Railroad tracks. Alfred Hummel, an official of the Hummel Warehouse Co., is president and general manager of the company.

Buffalo

BUFFALO, March 27.

The H. H. Franklin Mfg. Co., Syracuse, N. Y., has acquired local property for the erection of its new works to manufacture a light, four-cylinder, air-cooled automobile. The plant will have a maximum capacity of 100 automobiles per day. To provide funds, the company is disposing of an issue of $5,000,000 in preferred stock.

The American Radiator Co., 1807 Elmwood Avenue, Buffalo, will install a number of new machine tools at its plant, including drill presses, universal grinder, milling machine, etc.

Fire, March 23, destroyed a large section of the plant of the Union Iron Works, Fifteenth and Cascade streets, Erie, Pa., manufacturer of boilers, tanks, etc., with loss estimated at $450,000, including equipment.

The Third & Lafayette Street Garage Co., Jamestown, N. Y., is planning the erection of a one-story machine repair and service works, 80 x 85 ft., to cost about $20,000.

A one-story cold storage and refrigerating plant will be erected by the Webster Fruit Growers Co-Operative Association, Webster, N. Y., in connection with a new packing plant to cost about $150,000. The Bentley-Cogswell Co., 1900 East Avenue, Rochester, N. Y., is architect. George W. Dunn, Lake Road, West Webster, N. Y., an official of the association, is in charge.

The Sodus Cold Storage Co., Sodus, N. Y., will soon commence the construction of a new four-story cold storage and refrigerating plant on Maples Avenue.

Work will be placed under way at once for the erection of the superstructure for a power plant and automobile service and repair works at the new plant of the National Biscuit Co., Tenth Avenue and Fifteenth Street, New York, on Belt Line Street, Buffalo, estimated to cost about $1,000,000.

Baltimore

BALTIMORE, March 27.

The Board of Awards, office of the City Register, City Hall, Baltimore, will take bids until April 12, for a portable crane for use of the Water Department. William A. Megrew is the engineer.

The Western Maryland Railroad Co., Baltimore, has contracted with the Hagerstown & Frederick Railway Co., for power supply for its shops and buildings at Hagerstown, Md. The company will dismantle its former electric plant used for this service, and will install a quantity of new equipment to provide for the change, as well as for improvement in shop operations, to include air compressor, motors, etc.

The office of the commissioners of the District of Columbia, Washington, will take bids for furnishing and delivering wood-working machinery, tool grinders, etc., for use in the public schools. Detailed information can be obtained at Room 320, District Building. The commissioners will also receive bids until April 10 for one motor-driven, multi-stage, centrifugal pump and auxiliary equipment for the District workhouse. Cuno H. Rudolph, James F. Oyster and Charles Keller are commissioners.

The Consolidation Coal Co., Continental Building, Baltimore, will install new electrical and mechanical equipment at its Coalwood, W. Va., plant. W. L. Andrews is vice-president.

The J. H. Miner Saw Co., Columbia, S. C., has plans under way for rebuilding a 50 x 70 ft. structure, recently destroyed by fire.

The Board of Town Commissioners, Lexington, N. C., is taking bids until April 18 for extensions and improvements in the waterworks, to include a new pumping plant, with motor-driven centrifugal pumps and accessory equipment, electric transmission line, filter plant machinery, etc. The Gilbert C. White Co., Durham, N. C., is engineer. Paul R. Raper is clerk.

The Moncrief Furnace Co., Atlanta, Ga., is planning the erection of a new one-story works for the manufacture of furnaces, parts, etc.

The North State Power Co., Wendell, N. C., is planning to rebuild the portion of its electric power plant, recently destroyed by fire with estimated loss of $25,000. L. H. Couch is vice-president and general manager.

The office of the chief signal officer, United States Army, Washington, will take bids until April 7 for furnishing tools for switchboard and lineman's service; also until April 8 for furnishing 562 condensers.

The Bowie Stove Co., East Rome, Ga., has plans nearing completion for a new one-story factory, 100 x 400 ft., to replace its works lately destroyed by fire. A. F. Selman is head.

The Savannah Electric & Power Co., Savannah, Ga., is planning for extensions and improvements in its electric plants and systems during the present year to cost about $350,000, including equipment. R. C. Brooks is manager.

A vocational department will be installed in the two and three-story high school to be erected at Atlanta, Ga., estimated to cost $85,000. A. Ten Eyck Brown, Forsyth Building, is architect.

The North Carolina Electrical Co., Asheville, N. C., will expend about $300,000 for extensions and improvements in its electric power plants and systems, to include work now under way at the Weaver generating plant and at the Elk Mountain plant. The latter installation will comprise an 8000-hp. steam turbo-generator. Charles E. Waddell is engineer.

The Lombardy Street Automobile Repair Co., 13 South Lombardy Street, Richmond, Va., is planning for the installation of a new lathe, drill press and other machine and bench tools at its plant.

The Pinetops Milling Co., P. O. Box 65, Pinetops, N. C., recently organized, is planning for the installation of an engine and power department at its proposed plant. Frank H. Saunders heads the company.

The Atlanta Ice & Coal Corporation, Sisson Street, Atlanta, Ga., is planning for the erection of a new two-story ice-manufacturing plant, estimated to cost about $45,000.

The Southern Draft Regulator Co., 303 Wallace Building, Greenville, S. C., organized to manufacture draft regulators, will defer the establishment of a plant and will contract for the manufacture of its specialties. Prices are being asked on galvanized iron sheets, copper sheets, sheet iron and other materials for manufacture. A. M. Oeland is president.

Cincinnati

CINCINNATI, March 27.

The certainty that a coal strike will be declared April 1 is having a somewhat dampening effect on the machine tool industry. A local manufacturer, who has been negotiating with several coal mining companies for a number of tools, is in receipt of communications from each stating that deals will be held up pending the outcome of the strike. Other manufacturers are also in receipt of letters from various concerns giving the same reason for not closing on requirements at present. The past week, however, showed some improvement over the preceding weeks and a local manufacturer reports the week was the best since the first of February. The number of orders booked is fully on a par with similar periods in December and January, which were the best months in a year. No larger orders are being placed, the majority of the business being for single machines. Occasionally, however, five or six tools are bought and during the week a sale was reported of six milling machines to a manufacturer in this district. Railroad business is conspicuous by its absence, but inquiries from industrial concerns are showing much improvement. The used tool market is holding up well and according to dealers it is now an even break between new and used tools.

The Philip Smith Mfg. Co., Sidney, Ohio, washing machine manufacturer, has been sold at receivers' sale to William Joffe, Sidney, for $29,500. The plant will be operated by the new owner and it is stated that several large orders have been received which will keep it operating at capacity for several months.

The B. B. Polishing Machine & Mfg. Co., Springfield, Ohio, has been incorporated with a capitalization of $10,000 to manufacture polishing machines and other tools. Paul A. Schaefer, Harry A. Diehl, Charles C. Peck and James A. Hines are the principal incorporators.

The Master Tire & Rubber Co., Dayton, Ohio, will continue to operate under a receivership, Robert Cowden having been appointed to take charge. The receiver has been authorized to borrow $30,000 to carry on the business. A ruling has been made that the firm shall not accumulate a stock of more than 6000 tires.

Cleveland

CLEVELAND, March 27.

Reports from local machine-tool manufacturers indicate the demand is slowly showing a gain from week to week. A local manufacturer of turret lathes has taken more orders this month than in any previous month for over a year. Some activity is developing in Detroit, where a little buying has been done by automobile manufacturers this year. During the week Dodge Brothers bought eight turret lathes, and the Hudson Motor Car Co. two turret lathes. Two single machine orders have also come from railroads, one from the Union Railroad Co., Pittsburgh, and the other from the Dallas Railway Co., Dallas, Tex., each for a turret lathe. For the first time in months a local machine-tool manufacturer received a single tool order from Canada. Makers are also beginning to get some business from the Pacific Coast.

Cleveland dealers booked a fair volume of business the past week, mostly in single machines, a large share of the orders being for used machinery. One order from the East was for five used automatic machines. The largest new inquiry is from the Cleveland Board of Education for 30 machines, including about 10 metal-working tools, six woodworking machines and the remainder sheet material working equipment.

The National Automatic Tool Co., Richmond, Ind., has made a price reduction averaging about 10 per cent on its various types of multiple spindle drilling machinery.

The Cleveland Board of Education is receiving bids until April 10 for the following equipment for the Patrick Henry junior and the Audubon junior high schools: Two bench saws, two 30-in band saws, two 12-inch hand joiners, two combination oil stone grinders, two 11-in. x 6-ft. engine lathes, two bench drills, two electric grinders, two 30-in. squaring shears.

The Colonial Steel Co., Pittsburgh, has purchased a site at 2121 St. Clair Avenue, N. E., having a 50 ft. frontage and a depth of 132 ft. and will shortly commence the erection of a steel warehouse.

The plant of the Craig Tractor Co., Cleveland, has been leased to the Continental Products Co., which will expend about $20,000 in additions and alterations and will use the plant for the manufacture of automobile paints and varnishes. It is a steel building, 50 x 300 ft., occupying a six-acre site on Bliss Road and the Nickle Plate Railroad.

The Sterling Brass Co., Cleveland, which is building a new plant on St. Catherines Street, for the manufacture of plumbers' brass castings, expects to be in the market in April for oil fired smelting furnaces, core ovens and other foundry equipment.

Indiana

INDIANAPOLIS, March 27.

The Bryan Harvester Co., Peru, Ind., manufacturer of steam tractors and parts, has acquired the plant of the Weigle Machine Tool Co., adjoining its works, for extensions. A portion of the plant will be utilized for assembling of tractors, and another portion for storage, with other space held in reserve.

Citizens at Columbus, Ind., have approved a bond issue of $125,000, for a new junior high school, to include vocational department. Plans will be prepared at an early date by the Board of Education.

The Universal Portland Cement Co., Buffington, Ind., will install a number of new machine tools in its repair department, to include lathes, boring mill, planers, steam hammers, etc. Headquarters are at 210 South La Salle Street, Chicago.

The Macbeth-Evans Glass Co., Chamber of Commerce Building, Pittsburgh, will rebuild the No. 1 furnace at its plant at Elwood, Ind., and will install a new battery of lehrs, and other equipment. The work is estimated to cost about $35,000. John Klumpp, Jr., is in charge.

The Board of Sanitary Commissioners, City Hall, Indianapolis, has plans under way for a one-story municipal electric power plant estimated to cost close to $300,000, including equipment. L. B. Swift is president of the board. Charles H. Hurd, 1405 Merchants' Bank Building, is architect.

The Engman-Matthews Range Co., Goshen, Ind., manufacturer of ranges, stoves, etc., has acquired the plant and business of the A. C. Barler Mfg. Co., 341 East Ohio Street, Chicago, manufacturer of oil heaters, which will be removed to Goshen. R. O. and Richard C. Barler will become connected with the purchasing company and will be in charge of certain departments at the Goshen plant. The Engman-Matthews Co., established the plant at Goshen about two years ago, removing from South Bend, Ind.

The Wayne Oil Tank Co., Fort Wayne, Ind., has awarded contract to Max Irmscher & Sons, 112 West Berry Street, for a two-story and basement building to cost about $80,000.

The Reeves Pulley Co., Columbus, Ind., is arranging for the manufacture of the Reeves roller grinder and will establish a special department. For some time past the mechanism has been made at the plant of the Chandler-Taylor Mfg. Co., Indianapolis, which will discontinue the production effective with the operations at the Columbus works. G. A. Reeves is treasurer.

A vocational department will be installed in the new high school to be erected at Newcastle, Ind., estimated to cost about $300,000.

The Gulf States

BIRMINGHAM, March 27.

The Rudisill Soil Pipe Co., Birmingham, Ala., recently organized, has acquired a local plant for the manufacture of cast iron pipe. H. B. Rudisill is president, and W. C. Wilson, secretary and treasurer.

Fire, March 21, destroyed tanks and other property at the plant of the Humble Oil & Refining Co., Houston, Tex., with loss estimated at about $500,000. The works will be rebuilt.

F. O. Benoist, 2215 Bryan Street, Dallas, Tex., is considering the establishment of a plant to manufacture a patented brake equalizer for automobile service, consisting of a bronze housing with system of internal and external gears, to be attached to the driving shaft of the motor cars.

The New Orleans Railway & Light Co., New Orleans, is arranging for the immediate installation of a new 20,000 kw. turbo-generator at its power plant, with auxiliary machinery.

The Gulf & Ship Island Railroad Co., Gulfport, Miss., is having plans prepared for two buildings, 105 x 220 ft., and 75 x 200 ft., respectively, to replace its plant recently destroyed by fire. The structures will be equipped as a machine works, forge shop and power plant, and are estimated to cost about $75,000, with equipment. W. H. Gardner, Jr., is engineer.

The Southwestern Power & Light Co., Fort Worth, Tex., has disposed of a bond issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements in its electric power plants and system. The company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Braehead Coal Mining Co., Blocton, Ala., has acquired over 600 acres of coal lands in this section, and plans the installation of motors, hoisting and other electrical and mechanical equipment. C. C. Huckabee is president and manager.

The Common Council, Bastrop, La., is planning for the installation of new equipment at the municipal electric light and power plant. Bonds for $45,000 have been voted, a portion of the fund to be used for other municipal work.

The Darco Corporation, Wilmington, Del., a subsidiary of the Atlas Powder Co., manufacturer of carbon products, will build three plant units at its new works at Marshall, Tex., instead of a single unit, as previously intended. The plant is estimated to cost in excess of $500,000, including power house and other structures. Work on the first unit is under way.

The Union Oil Refining Co., Shreveport, La., recently organized with a capital of $1,000,000, has acquired the refinery of the Union Refinery & Pipe Line Co., Oil City, La. Plans are under way for extensions to the local plant, to include the installation of new equipment.

The Bryan Automatic Shoe Polishing Machinery Co., Bryan, Tex., is planning to enlarge its plant for the establishment of an automobile machine and general repair works. Machine tools and bench tools will be installed. The company recently increased its capital from $75,000 to $150,000 to provide for the expansion. P. P. Cooper is superintendent.

The Morrison & McCall Co., San Benito, Tex., is planning for extensions and improvements in the power plant of the San Benito Light & Water Co., recently acquired.

A vocational department will be installed in the new high school, 65 x 165 ft., to be erected by the Board of Trustees, Snyder Independent School District, Snyder, Tex., to cost about $75,000. George F. Campbell, Sweetwater, Tex., is architect.

J. M. Campbell, Milton, Fla., is planning for the establishment of a shipbuilding and repair plant.

The Department of Public Works, Miami, Fla., C. W. Murray, director, is planning for the installation of a new electric generator and auxiliary equipment at the municipal power plant.

The Board of Education, Birmingham, has preliminary plans under way for a new vocational and industrial high school for negroes at Ninth Street and Eighth Avenue.

A vocational department will be installed in the new high school at Lancaster, Tex., estimated to cost about

$100,000, to be erected by the Dallas County Board of Education, Dallas, Tex.

The Chamber of Commerce, Montgomery, Ala., is perfecting plans for the organization of a new company to construct and operate a local plant for the manufacture of concrete pipe, culverts, and kindred products.

Hanstrom & Tinning, Hutto, Tex., are planning to rebuild their electric light and power plant, recently destroyed by fire.

Detroit

DETROIT, March 27.

The Taylor Products Co., Kalamazoo, Mich., will build a five-story cold storage and refrigerating plant, 80 x 125 ft., to cost about $80,000, including equipment. Billingham & Cobb, Kalamazoo, are architects.

The Ka-Wood Gear Co., 2281 Superior Street, Detroit, is planning for the installation of new equipment at its machine shop.

A vocational department will be installed in the two-story and basement high school to be erected at Caro, Mich., estimated to cost about $100,000. Albert Meredith is president of the board.

The Kirth-Krause Co., Rockford, Mich., will commence the immediate erection of a two-story power plant, 40 x 100 ft., estimated to cost approximately $55,000. B. Parks & Son, Michigan Trust Building, Grand Rapids, Mich., are architects and engineers.

The General Box Co., Detroit, has been incorporated under Delaware laws to consolidate a number of manufacturers of wirebound boxes and containers. The Detroit Wirebound Box Co. will be included in the merger, as well as the Continental Box Corporation, Brewton, Ala. The new organization will establish headquarters at Chicago, and will operate plants in Cincinnati, Louisville, Nashville, East St. Louis, Detroit, Crawfordsville, Ind.; Selma, Mo.; and Bogalusa, La.

The Fay Motor Bus Co., Saginaw, Mich., is planning the erection of a one-story machine and repair shop, to handle all its repair and parts work. It will cost about $25,000. T. J. Fay is president.

The Hugh Lyons Co., Lansing, Mich., manufacturer of fixtures, automobile bodies, etc., is erecting a two-story steel manufacturing building, 60 x 240 ft.

The Cadillac Malleable Iron Co., Cadillac, Mich., has started construction of its new foundry. It will be 120 x 200 ft., and the annealing building 90 x 224.

The Central South

ST. LOUIS, March 27.

The Henry Vogt Machinery Co., Tenth and Ormsby streets, Louisville, manufacturer of ice and refrigerating machinery, etc., will soon take bids for a three-story addition, 40 x 180 ft., estimated to cost about $75,000. D. X. Murphy & Brother, 714 Louisville Trust Building, are architects.

The Common Council, Holton, Kan., will take bids until April 10, through Black & Veatch, 701 Mutual Building, Kansas City, Mo., consulting engineers, for a 100-kw. generator, with auxiliary equipment, for installation at the municipal electric power plant.

G. F. Williams, 2416 East Twelfth Street, Kansas City, Mo., has filed plans for a one-story machine shop, 50 x 132 ft., at 1809-11 Locust Street.

The Wilhoit Oil Co., Springfield, Mo., E. M. Wilhoit, president, is planning for extensions and improvements in its refinery at Joplin, Mo., estimated to cost about $100,000, including pumping machinery, boilers, tanks etc.

The Hurricane Light & Power Co., Little Rock, Ark., has plans under way for a new electric generating plant at Waverly, Tenn., to cost in excess of $400,000, including equipment.

A vocational department will be installed in the three-story high school, 80 x 275 ft., to be erected on Richmond Avenue and Orleans Street, Memphis, Tenn., estimated to cost $150,000. C. O. Pfeil & Co., 1402 U. & P. Building are architects.

The Board of Public Works, Marshall, Mo., is planning for the erection of a new unit at the municipal electric power plant to cost about $30,000.

The Producers' Wood Preserving Co., a subsidiary of the Ayer & Lord Tie Co., Railway Exchange Building, Chicago, will install a power plant in connection with its new creosoting works at Louisville, with other equipment to comprise air compressors, hydraulic pumping machinery, steel tanks and cylinders, tram cars, etc. The entire plant will cost about $100,000. The Leonard Construction Co., 37 South Wabash Avenue, Chicago, has the erection contract. Russell Lord is president.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, has awarded contract for its three-story power plant extension at Hazard, Ky., to the Foundation Co., 120 Liberty Street. It will cost in excess of $250,000, including equipment. F. R. Weller, Mills Building, Washington, is consulting engineer.

The Louisville Gas & Electric Co., Louisville, has applied for permission to utilize waters at Dam No. 41 on the Ohio River, for the erection of a new hydroelectric generating plant with initial capacity of 25,000 hp. and ultimate output of 75,000 hp.

The Equitable Lumber & Supply Co., Jeff, Ky., will build a new one-story machine shop. Electrically operated pumping machinery will also be installed.

The Allburn Coal Co., Plattsburgh, Mo., recently organized to take over the properties of the Plattsburgh-Vibbard Coal Co., is planning for the installation of new electrical and other machinery at the plant. It is proposed to practically rebuild the present mining plant.

The Creech Automobile Repair Co., 209 East Twentieth Street, Joplin, Mo., is planning for the installation of a new lathe, drill press and other equipment. Gaylor Creech heads the company.

The Common Council, Muskogee, Okla., is planning the erection of a new municipal electric light and power plant. George H. Walker, mayor, is in charge.

A vocational department will be installed in the two-story high school to be erected at White City, Kan., to cost about $80,000, for which bids are being taken until April 6. J. H. Felt & Co., 800 Grand Avenue Temple, Kansas City, Mo., are architects.

Milwaukee

MILWAUKEE, March 27.

Prospects for volume in machine-tool sales are growing steadily, although immediate trade remains restricted by the competition from used equipment. Local manufacturers have not been able to hold any headway in the direction of larger production schedules, but the outlook is regarded as promising. At the annual convention of Wisconsin gas and electric utilities, held in Milwaukee the past week, it was authoritatively stated that more than $50,000,000 will be disbursed in this State alone in 1922 for new steam and hydroelectric equipment, buildings, transmission lines, etc. The automotive industries are increasing their demand upon Milwaukee parts shops. The Lavine Gear Co., for instance, reports that March shipments so far are greater than its shipments for the entire year 1921. Improvement in motor truck trade is probably the outstanding feature of developments in the automotive industries in March.

The Northwestern Steel & Iron Works, Eau Claire, Wis., sustained an estimated loss of $100,000 or more by fire on March 18, which destroyed the machine shop, assembling floor, warehouse, stock room and office building, leaving intact only the foundry. The burned structures will be rebuilt at once. In the meantime the company has arranged with the Phoenix Mfg. Co., local, to use the larger part of its machine shop and is keeping the foundry in uninterrupted operation. It manufactures a steam pressure cooker and other specialties. E. R. Hamilton is general manager.

The C. A. Shaler Co., Waupun, Wis., has let the general contract to the Hutter Construction Co., Fond du Lac, Wis., for the construction of a new factory to replace the group destroyed by fire a month ago, with a loss of more than $300,000. The new plant will be of brick, steel and concrete, one story, ell-shaped, 50 x 300 and 50 x 150 ft., with steel sidewall and monitor sash. The company manufactures tire and rubber vulcanizing equipment and other automotive specialties.

The National Straw Works, 449-453 Eighteenth Avenue, Milwaukee, will remodel and double the size of its steam generating plant and will purchase two new 150-hp. boilers, auxiliaries and other equipment. Contracts for the construction will be let today by Herman J. Esser, architect, Camp Building, Milwaukee.

The Automatic File & Index Co., Green Bay, Wis., manufacturer of steel, wood and combination wood and steel office furniture, etc., contemplates further enlargement of its factory, erected in 1919. Details of the proposed improvements have not been thoroughly worked out, but it is estimated that the investment in building, machinery and additional power facilities will be about $75,000. Fred L. Straubel is president and general manager.

Herman Krie and Arthur Schmidt of Manitowoc, Wis., have formed a partnership to manufacture sheet metal goods and specialties and have opened a shop at 918-920 Hancock Street.

H. R. Swanke, Tigerton, Wis., will build a public garage and machine shop, 30 x 115 ft., part two stories and basement, to cost about $18,000 complete. The architects are Oppenhamer & Obel, Green Bay and Wausau, Wis.

The Stevens-Prentice Mfg. Co., Milwaukee, has been incorporated with a capital stock of $50,000 to manufacture mechanical devices. The incorporators are Fred W. Brown, Charles Stevens and Lloyd M. Prentice, 199 Twenty-third Street, Milwaukee. No arrangements have been made as yet for manufacturing facilities.

The Interior Woodwork Co., Fifth Avenue and Park Street, Milwaukee, has let the general contract to Henry Danischefsky, 1484 Humboldt Avenue, local, for a manufacturing addition, three stories, 67 x 160 ft., and a storage addition, two stories, 73 x 101 ft. Considerable new power and wood-working machinery will be required. Herman J. Esser Camp Building, is the architect in charge.

The Burlington, Wis., Board of Education will take bids soon for the erection and equipment of a new senior high school, 190 x 262 ft., two stories and basement, to contain manual training shops, gymnasium, laboratories, etc. It is estimated to cost about $190,000.

The Board of Education, Whitehall, Wis., is ready for bids on a junior high and vocational training institute, 75 x 150 ft., two stories and basement, designed by Oppenhamer & Obel, architects, Wausau and Green Bay, Wis. The cost will be about $125,000, including equipment for shops.

The Wisconsin Power, Light & Heat Co., Madison, Wis., has been granted authority to issue $300,000 of 7 per cent preferred stock for enlargement and extensions to the property.

The J. I. Case Plow Works Co., Racine, Wis., which has been operating on minimum schedules for nearly a year, is preparing for a resumption of work with a normal force of 350 to 400 men, due to the satisfactory movement of Wallis tractors and tractor implements in recent weeks under the stimulus of price reductions and the improved farm situation. It plans to make some replacement of tool equipment, but no large purchases are in immediate prospect.

Canada

TORONTO, March 27.

Inquiries for practically all lines of equipment are increasing and many of those received by dealers a month or two ago are bringing in results. Manufacturers are also experiencing a better demand for their products and during the past couple of months have increased their output. Although the demand for equipment is improving it is still much below normal, but it is the general opinion that better times are not far distant.

The Kelsey Wheel Co., Ltd., Windsor, Ont., is in the market for a 175 to 250-hp., three-phase, 25-cycle, 900 r.p.m., 550-volt, synchronous motor.

Carr & Carrick, 149 Victoria Street, Sarnia, Ont., are in the market for an air compressor, hydroelectric motor; automatic cut out and tank, complete outfit.

The E. T. Wright Co., Kelly and Wellington streets, Hamilton, Ont., is asking for a used Toggle drawing press, 3½ x 3¼.

The L. R. Weeks Co., Welland, Ont., will build an addition, 80 x 400 ft., for the production of seamless tubing.

The Electric Steel & Metals, Ltd., Welland, Ont., is building a plant, 75 x 400 ft.

As a result of the Provincial Government extending the Sturgeon and Lic limits one year, the Great Lakes Pulp & Paper Co., will spend $3,000,000 on the erection of a paper mill at Fort William, Ont.

The B. & L. Laboratories, care of Mayor Nash, Aylmer, Ont., is preparing to erect a manufacturing plant.

The Western Clock Co., 383 George Street South, Peterborough, Ont., will build a factory at a cost of $80,000. John H. Vernor is interested.

The erection of a factory at St. Thomas, Ont., is proposed by Wood Gorrie Motors, Ltd. W. H. Smith, 163 King Street West, Toronto, is engineer.

The R. H. Miner Co., Ltd., Montreal, is in the market for a No. 23 or 36 Symons disk crusher and one-jaw crusher, 36 x 36-in. opening or larger.

The Lymburner Brass Works, 1025 Boyer Street, Montreal, is asking for complete equipment for a brass foundry.

The Central Machine & Welding Co., 38 Bromstone Lane, Montreal, is in the market for a welding machine and small lathe.

The Waterworks Commission, Brantford, Ont., is having plans prepared for an addition to the pumping station to cost $225,000, including the installation of three-gage centrifugal pumps with electric motors.

The Canadian Rampo Iron Works, Niagara Falls, Ont., manufacturer of railroad switches, crossings and switch stands, is making additions to its plant. Considerable new equipment has been installed, and it is now proposed to erect a new building, representing an outlay of about $100,000.

It is reported that the Durant Motors of Canada, will build an addition to the plant at Leaside, Toronto, the new building to be completed by early fall. When completed the entire plant will cover a site of 28 acres and will employ a force of 3000 men, as compared with 600 at present. The capacity of the plant will be 50 cars per day.

The Pacific Coast

SAN FRANCISCO, March 21.

The Henry Cowell Lime & Cement Co., 2 Market Street, San Francisco, has acquired a large tract of land at Tehachapi, Cal., and contemplates the erection of a new cement manufacturing plant estimated to cost in excess of $1,000,000.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has awarded contract to E. B. Newcomb, Pantages Building, Los Angeles, for a six-story building, 170 x 240 ft., at Fifth and San Pedro streets, Los Angeles, to cost about $700,000. Local offices of the company are in the Van Nuys Building.

The San Joaquin Light & Power Corporation, Fresno, Cal., will commence work early in April on a power project, estimated to cost $25,000,000, and requiring several years for completion.

The Jet Oil Co., National City, Cal., has acquired a local site and plans the erection of a new refinery, with initial unit to cost about $60,000. Other units will be constructed later.

H. R. Retichier, Redondo, Cal., has plans under way for a new ice manufacturing and refrigerating plant, estimated to cost about $75,000, including machinery.

A new vocational and manual arts building will be erected at the high school at Whittier, Cal. Myron Hunt, 1107 Hibernian Building, Los Angeles, is architect.

The Union Oil Co., Los Angeles, is planning the erection of a one-story machine shop on property recently acquired at Santa Fe Springs, Cal.

The Nelson Motor Co., Spokane, Wash., is planning the erection of a new one-story machine and service works, 100 x 160 ft., at Sprague and Grant streets. E. O. Nelson is general manager.

The Griffin Wheel Co., Tacoma, Wash., has taken a contract from the Northern Pacific Railroad Co., for 2500 car wheels each month of the present year, at a cost approximating $37,000 a month, and will increase production to handle the order.

A vocational department will be installed in the new high school to be erected at Sandpoint, Idaho, estimated to cost about $140,000.

The City Council, Boise, Idaho, has been granted permission to utilize a site on the North and South Forks of the Payette River for a municipal hydroelectric power plant.

Idaho Clays, Inc., Coeur d'Alene, Idaho, has acquired property in the Hayden Lake section, and plans the erection of works for the manufacture of tile and kindred products. It will include a power plant and is estimated to cost close to $500,000 with machinery.

The City Council, Puyallup, Wash., has tenative plans under consideration for a municipal hydroelectric generating plant estimated to cost about $60,000.

The Chafer, McLaughlin & Hillier Co., Portland, Ore., has plans under way for a lumber mill on the Columbia Boulevard, estimated to cost in excess of $100,000, including machinery. It has acquired an 8-acre site.

The Mt. Spokane Power Co., Spokane, Wash., will build a new electric power plant in the vicinity of Milan, Wash., on the Little Spokane River. Plans will be prepared at once.

The Wilson Lumber Co., Centralia, Wash., recently organized, will build a new mill estimated to cost in excess of $80,000, including equipment.

The Victor Products Corporation, 560 Van Buren Street, Chicago, Ill., now has a part of its plant in operation in production. The part now running is mainly the department for manufacturing iron and steel studs and screw machine products. The plant is 50x125 feet.

IRON AND INDUSTRIAL STOCKS

Irregularity, with a Slight Advantage on the Down Side

Irregularity, with a slight advantage for the down side most of the time, has characterized the market for securities of late. Uneasiness over the coal strike situation, political developments at Washington, and the slow recovery in general business have been the chief causes for security selling. Such influences are offset by a strengthening in the Federal reserve situation, the process of deflation abroad, with the exception of eGrmany, the better feeling in the automotive industry, firmer prices for steel mill products and for certain other manufactured products. Whenever selling pressure in securities relaxes, prices snap back well.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	44¼- 47	Lack. Steel	47½- 50⅜
Allis-Chalm. pf..	93½- 94	Lima Loco. 101	-108¼
Am. B.S.&F. com.	58½- 60	Lima Loco. pf..106	-107½
Am. Can com...	44⅞- 46¾	Midvale Steel ..	32½- 35
Am. Can pf.....101¼	-102½	Nat.-Acme	12½- 16½
Am. C. & F. com.153¼	-155¾	Nat. E. & S. com.	34 - 36¾
Am. C. & F. pf.118	-119	Nat. E. & S. pf..	83½- 88¾
Am. Loco. com..107¾	-109¾	N. Y. Air Brake	62 - 64¼
Am. Loco. pf....116¾	-117	Nova Scotia Steel	25 - 26¾
Am. Rad. com..	83½- 88½	Otis Steel com..	11¾- 12⅝
Am. Stl. F. com.	33½- 36⅞	Otis Steel pf...	49 - 53⅛
Am. Stl. F. pf... ..	- 95	Press. Steel com.	69¼- 72
Bald. Loco. com.105½	-108¾	Press. Steel pf..	.. - 92
Bald. Loco. pf.. ..	-108¾	Ry. Stl. S. com...	96 - 97½
Beth. Steel com.	60½- 66¾	Ry. Stl. S. pf....	.. -115
Beth Steel, Cl. B	64¼- 72	Replogle Steel...	30 - 32¼
Beth. Stl. 8% pf.108½	-112½	Republic com....	50⅞- 58
Brier Hill com..	17½- 18	Republic pf.....	76⅞- 78¾
Br. Em. St.....	8¾- 9	Sloss com.	40½- 43¼
Br. Em. St. 1st pf	61 - 63	Sloss pf.	66 - 69
Br. Em. St. 2d pf	19¾- 20½	Steel of Canada.	63 - 64½
Chic. Pneu. Tool.	65½- 68	Stewart-Warner.	36 - 37
Colo. Fuel	29¼- 31¾	Superior Steel ..	28¼- 30¼
Cruc. Steel com.	55¼- 57⅞	Trans.-Williams.	36 - 41½
Cruc. Steel pf...	84¾- 85¾	Un. Alloy Steel..	29¾- 31¾
Deere pf.	71 - 71½	U. S. Pipe com..	33½- 36⅞
Gen. Electric ..153	-156½	U. S. Pipe pf....	65½- 66
Gt. No. Ore Cert.	35½- 37	U. S. Steel com..	93⅝- 96
Gulf States Steel	71¼- 74¼	U. S. Steel pf....116⅝	-117⅞
Harbison Walker	95 - 96½	Vanadium Steel..	37¾- 39½
Inland Steel	49¾- ..	Va. I. C. & Coke	45 - ..
Int. Har. com...	93¼- 95½	West'ghouse A. B.	81 - 86
Int. Har. pf....110	-110¼	West'ghouse Elec.	57 - 57¾

Industrial Finance

A voluntary petition in bankruptcy has been filed in behalf of the Atlas Foundry Co. of Milwaukee by George Gerlinger, secretary and treasurer. Schedules admit liabilities of $37,116, and claim assets of $6,229. The Gerlinger Electric Steel Casting Co., is one of the principal creditors, with a claim of $6,168.

The Milwaukee Circuit Court has approved the sale of the assets of the Seymour Laboratoried Units, Inc., Milwaukee, to G. W. Stratton, for $39,000, as the result of a public auction conducted by Julius J. Goetz, receiver. The receivership proceedings were instituted by the Matthew Addy Co., Cincinnati.

The entire properties of the defunct John Obenberger Forge Co., Milwaukee, having an appraised value of $955,342, have been sold to a syndicate composed of the secured creditors represented by Adolph Weidner, attorney, 105 Wells Street, Milwaukee, for $48,000 in cash and assumption of secured claims. This was the only bid received by J. F. Gerdis, trustee, at the receiver's sale held March 10. After deducting administrative expense, it is figured by the trustee that a dividend of 2 per cent on unsecured claims will be possible. The secured claims amount to $185,000 and the principal creditors, who participate in the purchase of the property, include the First Wisconsin National Bank of Milwaukee; the Erie Forge & Foundry Co., Erie, Pa., and Klug & Smith, Mack Block, Milwaukee, general contractors. The works were operated for about five months until recently by permission of the court. The new owners already are readjusting affairs and expect to resume the operation by April 15 or May 1.

The 1921 report of the Walworth Mfg. Co., Boston, wrenches, pipe fittings, etc., shows a deficit of $1,232,742, after adding $290,713, representing earnings in prior years to the surplus account to conform with federal tax rulings, and $84,151 representing good will of branch stores paid for in cash. Its 1920 report showed a surplus of $438,471, and its 1919, one of $368,305. The 1921 report states that incoming business since December 31, last, is running well in excess of that for the corresponding time in 1921.

The annual report of the Standard Sanitary Mfg. Co., Pittsburgh, for 1921 disclosed a reduction of $2,750,918 in accounts payable. Cash and accounts receivable were $6,840,921 against $7,908,805 in 1920. The profit and loss surplus and reserve increased from $4,381,870 in 1920 to $5,591,325 in 1921.

Some confusion, because of similarity of names, has arisen over the recent announcement of a receivership for the Pittsburgh Steel Tube Co., of Beaver, Pa. There has been a mistaken impression that the Pittsburgh Tube Co., with a plant at Monaca, Pa., was meant. Receivers were appointed for the Beaver company.

Directors of the Wheeling Mold & Foundry Co., for the first time in the history of the concern, recently voted not to pay the regular quarterly dividend on preferred stock. The preferred stock dividend rate has been 8 per cent, payable quarterly. Dividends on the common stock of the company ceased Feb. 1, 1921.

The annual report of the E. W. Bliss Co., for 1921 showing net earnings after taxes and inventory adjustment of $2,925,125 equal to $9.28 a share on the 300,000 shares of common no par value, is in marked contrast to majority of statements of industrial companies. It compares with net earnings in 1920 of $2,376,338, equal to $7.53 a share. Despite general industrial depression the company in 1921 was able to show earnings in excess of any year since 19.. when the figures were abnormal due to war contracts. There was added to surplus after dividends $2,123,760.

Wagner Electric Mfg. Co. stock sold on the St. Louis Stock Exchange on March 16 at $27 a share, being the highest point it has reached since last November.

The annual report of the St. Joseph Lead Co. shows net income for 1921 of $1,096,273, against $4,813,513 for 1920. After depletion of $1,218,284; taxes, etc., $224,453, and dividends, $1,784,442, there was a deficit of $2,193,906 contrasted with a deficit of $1,287,475 in 1920.

For the year ended Dec. 31, 1921, Wickwire Spencer Steel Corporation shows net loss after charges, depreciation and inventory adjustment of $3,635,040, as compared with net income of $662,116 in the previous year.

Good Showing of American Radiator Co.

American Radiator Co. has issued its annual report, for the year ended Dec. 31, 1921, showing net profits, after all charges and Federal taxes, of $3,046,645, equivalent, after deduction of preferred dividends, to $5.13 a share (par $25) earned on the $13,806,225 common stock. This compares with net profits of $3,367,717, or $5.72 a share, in the previous year. Net profits of foreign subsidiary companies amounted to $787,710, of which the parent company received $666,030.

Virginia Iron Earnings

The Virginia Iron, Coal & Coke Co. reports net earnings for 1921 of $355,458, equal to $3.35 a share on the old capitalization of $10,000,000 outstanding at the close of last year, compared with $2,140,052 the preceding year. Gross earnings for the year amounted to $3,842,882, compared with $16,465,047 in 1920, and operating expense $3,083,274. Fixed charges, bond interest and taxes totaled $424,150.

Trade Changes

The American Rolling Mill Co., Middletown, Ohio, has opened a new office in Houston, Texas, and has placed C. C. Lynd, formerly in charge of the New Orleans office of the company, in charge. The New Orleans office has been closed.

The Pittsburgh office of the Hendrick Mfg. Co., Carbondale, Pa., is now at 544 Union Arcade Building.

The Taft-Peirce Mfg. Co., Woonsocket, R. I., has moved its Detroit office from 1311 Majestic Building to 2230 First National Bank Building. William Fairhurst is manager of the Detroit office.

The Cruban Machine and Steel Corporation is now occupying the seven story corner building, 60 Varick Street corner Laight Street, New York.

The New Jersey Die Casting Co., Irvington, N. J., has acquired the assets of the Die Casting Co. of New Jersey, including land, buildings, machinery, tools and equipment.

The Lyons Level & Tool Co., tool manufacturer, New Haven, Conn., recently filed a certificate changing the name to the Lyons Mfg. Co. It will also increase the capital from $50,000 to $150,000.

During the last three months there have been a number of changes in the sales organization of the Celite Products Co., Chicago. The policy of this company has been that increased business could be secured only by direct concentrated effort, and with this object, branch offices have recently been established in Boston, Buffalo, Cincinnati, and Minneapolis. F. W. Emerson has been placed in charge of the Boston office, W. D. VanArnam is district manager of Buffalo territory, L. M. Lindsey is in charge of the Cincinnati office, and E. R. LaBelle is at Minneapolis. A change has also been made in our New Orleans office and J. C. Etheredge is now district manager for that territory.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined iron bars, base price	2.38c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.38c.
Hoops, base price	3.28c. to 3.38c.
Bands, base price	2.88c. to 2.98c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.48c.
Channels, angles and tees under 3 in. x ¼ in., base	2.38c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.40c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.60c.
Toe-calk, ½ x ⅜ in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.48c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.55c. to 3.80c.	.....
Nos. 22 and 24	3.60c. to 3.85c.	4.10c.
No. 26	3.65c. to 3.90c.	4.15c.
No. 28	3.75c. to 4.00c.	4.25c.
No. 30	4.00c. to 4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.85c. to 4.10c.
No. 16	4.00c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—56	—40	¾ in. Butt	—30	—13
¾ in. Butt	—61	—47	1½ in. Butt	—32	—15
1-3 in. Butt	—63	—49	2 in. Lap	—27	—10
3½-6 in. Lap	—60	—46	2½-6 in. Lap	—30	—15
7-8 in. Lap	—56	—34	7-12 in. Lap	—23	— 7
9-12 in. Lap	—55	—33			

Steel Wire

Base Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¾c. to 17 c.
High brass wire	17 c. to 17¼c.
Brass rod	14¼c. to 14½c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	20¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 20½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
			Primes Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.05 $5.80
		90 lb.	6.15 5.90
		100 lb.	6.25 6.00
IC	$10.00 $8.50	IC	6.40 6.15
IX	11.50 10.00	IX	7.40 7.15
IXX	13.00 11.25	IXX	8.40 8.15
IXXX	14.25 12.50	IXXX	9.40 9.15
IXXXX	16.00 14.00	IXXXX	10.40 10.15

Terne Plates

8-lb. coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	32c.
Bar	37c. to 42c.

Copper

Lake ingot	15 c.
Electrolytic	14¾c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	23c.
No. 1 solder	21c.
Refined solder	17c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	5½c. to 5¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	25c. to 27c.

Old Metals

The market has slowed down in sympathy with new metals. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.50
Heavy machine composition	7.75
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	6.75
Lead, heavy	3.75
Lead; tea	2.50
Zinc	2.50